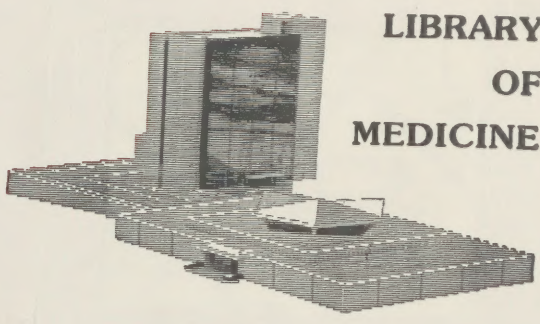




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IWO JIMA

Planning Organization and Training

Iwo Jima was the point chosen for launching the attack on the inner defenses of the Japanese Empire. The many lessons learned by the Navy Medical Department during the amphibious operations of the spring, summer, and autumn of 1944 in New Guinea, the Marianas, the Carolines, and the Philippines were employed to advantage in planning for the assault on Iwo Jima in February 1945. This bit of volcanic rock and sand located some 300 miles north of the Marianas and approximately 750 miles south of Tokyo was needed as an airbase to furnish fighter cover for the B-29 bombers operating from bases in the Marianas.¹ Iwo Jima measures five miles from the rugged northern tip to the Suribachi volcano at the southern end, and is only 2 1/2 miles wide at its broadest point. As a pivotal point in the enemy's defense, it had been built up as one of the most heavily fortified bases in the Pacific. Moreover, the coastal terrain was made to order for defense. Due to the nature of the terrain, there could be no tactical surprise as to where the Marines would land; they would have to land on the southeastern beaches, and it would have to be frontal assault. Under the circumstances, the Navy Medical Department anticipated

1. Fleet Admiral Ernest J. King, "U. S. Navy at War", Second Official Report, 1 Mar. 1944 to 1 Mar. 1945, p. 25.

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2
heavy casualties.

Medical planning for the Iwo Jima campaign was begun as early as October 1944. In preparation for the operation, numerous conferences were held among the medical representatives of the naval, Marine Corps, and amphibious units which were to participate. By means of these conferences, many medical problems both tactical and logistical were adjusted.³

For purposes of computing anticipated casualties, it was assumed that the period of active combat would last 14 days from the beachhead landings to seizure of the objective. It was estimated that 5 percent of the entire attacking force would become casualties on each of the 1st and 2nd days; 3 percent of the force on the 3rd and 4th days; and 1 1/2 percent of the entire force on each of the remaining 10 days. It was further estimated that 20 percent of all casualties would be dead or missing.⁴

To provide the necessary hospital facilities to care for the high casualties which were anticipated was a matter of especial concern. Not only was it necessary to care for the combat forces, along with associated shore-based naval units and advanced echelons of garrison forces, but it was also

-
2. Joel D. Thacker, "The Marines in Action", MS to be published by Marine Corps Historical Division.
 3. Action Report, Commanding General Headquarters V Amphibious Corps, 20 May 1945, pp 414-415.
 4. Task Force 56, Commanding General Expeditionary Troops, 1 April 1945, p. 71.

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necessary to make plans to care for 1,500 civilians thought to be on the island (which latter problem, fortunately, failed to materialize). Also to be considered was the effect of an interruption of shore-to-ship evacuation, due either to enemy action or rough water over very poor beaches. The very limited area available for setting up hospital facilities ashore, along with the large number of troops that would be present, proved a serious problem in planning for the care of the estimated number of casualties. V Amphibious Corps plans called for the use of the 3rd, 4th and 5th Marine Divisions respectively, and the V Amphibious Corps Medical Battalion. The Corps Evacuation Hospital #1, which had arrived from the mainland a short time before, was attached to the V Amphibious Corps, and the 39th Field Hospital of the U . S. Army was transferred from the garrison force to the assault forces. After the Marianas Campaign, on recommendation by Headquarters, each medical company in the Marine Divisions and the corps medical battalions had been authorized equipment for 144 beds instead of the usual 72. This made a total of approximately 3,592 beds available. Plans were also made by the 8th Field Depot, which was scheduled to arrive about D plus ten days, to add a sufficient quantity of cots, tents, blankets, and mess gear to its stock of supplies and equipment so as to augment the basic equipment of the hospitals by 1,500⁵ beds.

5. V Amphibious Corps, pp. 422-425.

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A detailed chain of evacuation was set up to handle the casualties. Four LST(H)'s, or evacuation control LST's, especially equipped with medical personnel and supplies, were provided to make preliminary "screening" examinations of casualties and distribute them equally among available transports and hospital ships. One LST(H) was available to each of the beaches; or two, for each Marine Division. All boats, LVT's, or DUKW's, which evacuated wounded from beaches were to proceed to their respective evacuation control LST(H)'s. Those casualties who were unable to stand the boat trip to transports or to hospital ships were to be transferred to an LST(H) for treatment until such time as their condition warranted further transfer. These latter casualties were to be lifted by cranes in Mills-Harris slings and lowered into the tank deck where first aid and shock treatment were to be administered. All others were to remain in LCVP's and be sent to transports or hospital ships designated by the evacuation control officer. Ordinary casualties being evacuated by LVT's or DUKW's were also sent to LST(H)'s, where they were unloaded onto the pontoon barge alongside the LST(H), and retransferred into LCVP's before being taken to waiting transports or hospital ships. This procedure was intended to relieve the LVT's and DUKW's for further military duty, and also place the casualties in faster and more comfortable boats.

Each LST(H) had 4 surgeons and 27 corpsmen as permanent

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medical complement. This number was increased by the transfer of one beach party medical section (1 medical officer and 8 corpsmen) from APA's at the objective, giving each LST(H) 5 surgeons and 35 corpsmen. These beach party medical sections were on call by their TransRon (Transport Squadron) commanders if needed. Besides the above complement the 4th Marine Division arranged to send one medical officer and two corpsmen to the LST(H)'s serving their beaches for recording purposes.⁶

Two hospital ships and one APH were also planned for this operation. The first one was scheduled to arrive on D plus one day. Patients were to be evacuated to Saipan, where 1,500 beds were available, and to Guam, where there were 3,500 beds. Air evacuation of casualties to the Marianas area was to begin as soon as field facilities would permit, and it was planned to provide for 350 patients per week. Experience gained in the Marianas Campaign had emphasized the necessity of having the casualties screened by a qualified flight surgeon to insure that only those whose condition would permit air evacuation were removed by this means. It was indicated that medical personnel and certain medical supplies and equipment should be aboard each plane. A request was, therefore, submitted for an air evacuation

6. Commander of Task Force 53, ComPhilBGrp. 2, 2 Apr. 1945, pp. 71-72.

Note: the medical plan for the use of LST(H)'s, which were employed for the first time in the Iwo Jima operation, is given in Appendix A.

team consisting of one or more qualified medical officers and other medical personnel to be assigned for this purpose. This request was approved and the agency furnishing the planes was directed to supply the necessary personnel, supplies, and equipment.⁷

Preventive medicine also entered prominently into the planning. Since there was a possibility that epidemic typhus, scrub typhus, cholera and plague might be present at the objective, all personnel were inoculated against typhus, cholera and plague in addition to the usual immunizations. The clothing of the landing force was impregnated with dimethylphthalate and DDT powder as a preventive measure against lice and mites. As a means of controlling flies, which had been such a nuisance and a hazard to health in previous operations, plans were made to spray the area occupied by American troops with DDT. Initially, this spraying was to be done by carrier-borne aircraft; later, by land based planes when airfield facilities became available. A medical officer, familiar with the procedure, was detailed aboard a carrier as technical advisor and the malaria and epidemic control team of the 4th Marine Division, and was designated to furnish the technical ground supervision.

Frequent inspections of water supplies to determine

7. CTF 56, pp. 308-310.

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bacteriological purity and freedom from poison were to be performed and each Malaria and Epidemic Control Team was furnished with a water testing kit for chemical warfare agents. Prefabricated "knock-down" type heads and fly traps were to be carried by the assault forces. Plans were also made for the dissemination of information to the troops on the diseases likely to be encountered⁸ and the preventive measures necessary.

The medical supply plan for the operation included an initial thirty-day allowance carried with the assault forces, plus medical and sanitary supplies for 1,500 civilians, as well as the provision for "block" shipments arriving at regular intervals during the operation.⁹ Approximately 50 percent of the supplies of the assault forces and all of the "block" shipments were to be palletized (packaged) and waterproofed. Plans also provided for an adequate emergency resupply that could be sent¹⁰ by air if necessary.

Experience gained in previous operations had shown that there was a great need for a blood bank. With the establishment by the Surgeon General of the Navy of Whole Blood Distribution Center #1 at Guam, it became feasible for the first time to set up a center at the target area and plans were made accordingly.

8. CTF 56, pp. 308-310.

9. Some idea of the magnitude of the medical supply problem for and operation like Iwo Jima may be gained from an examination of the items required by a single medical battalion; they are listed in Appendix B.

10. CTF 56, pp. 324-325.

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Up to this time, whole blood had been obtained from hospital
corpsmen, Marines and occasionally from patients of the medical
companies.¹¹ LST(H) 929 was designated to carry the whole blood
bank for distribution of whole blood to the forces both afloat
and ashore during the early stages of the operation. When the
military situation permitted, the blood bank was to be landed
and established ashore under landing force supervision. At
Saipan, prior to the departure for Iwo Jima, all ships were
ordered to receive whole blood in the quantities shown below:

Each APA	-	16 flasks
LSV OZARK	-	500 "
LST(H) 929	-	1100 " (whole blood bank)
Each AH	-	812 "
LST(H) 930, 921, 1033	-	16 flasks

Additional whole blood was to be furnished by incoming AH's, or¹²
was to be flown in from Guam when air facilities were organized.

A photographic team from the Bureau of Medicine and
Surgery, which arrived just prior to the operation, was attached
for temporary duty to the V Amphibious Corps Medical Battalion
and plans were made for the group to obtain the materials they
desired.¹³

11. CTF 56, pp. 307-308.

12. CTF 56, pp. 71-72.

13. CTF 56, pp. 308-310.

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Paralleling the planning work of the higher echelons was that undertaken by the Marine divisions and the transport divisions and squadrons. For example, the division surgeon of the 5th Marine Division, upon receipt of the corps order and medical plan for the Iwo Jima operation on 17 October 1944, made a detailed survey of medical supplies, equipment, and personnel. All of the medical supplies required for the operation were stocked without difficulty. Personnel unfit for combat duty were eliminated as far as practicable. Then, besides replacements, enough additional personnel were ordered to bring the Division to 5 percent of T/O strength and thirty-six Marines were assigned to each infantry regiment for training as litter bearers. Collecting sections of assigned medical companies were given strenuous field training during October, November, and December 1944. The entire division (reinforced) was inoculated against plague, cholera and typhus. Tetanus boosters were administered. All units were instructed to treat clothing with DDT and dimethylphthalate. Conferences were held for all medical officers and hospital corpsmen, prior to embarkation, to discuss the "over-all picture" of the duties of the medical department in the field and to give each officer and man an opportunity to ask questions on his own particular duties. The medical battalion was instructed to carry an additional 1,500 blankets, 5,000,000 units of gas gangrene anti-toxin and 50,000,000 units of penicillin. An inspection was made of the jungle kits and dog-tags of each man in the division. In addition, an inspection

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was made of all medical department supplies and equipment. All shortages were noted and each unit was brought to a state of
14
readiness.

A training program was employed to acclimate medical personnel to shipboard life, to debarkation by means of nets, and to the routine of boat assignment and the formation of boat waves. Practice was given in the keeping of medical records, the automatic exchange of litters and the handling of casualties in and out of boats. Near the close of the training period a practice landing was made to give the medical personnel an idea
15
of what to expect when landing on the target.

A serious problem noted by the surgeon of the 4th Marine Division was the fact that surgeons who were to be called upon to perform the most difficult and extensive type of abdominal operations during the battle had had little opportunity to touch a knife for six months prior to the campaign. To correct this situation, the Division Surgeon recommended that a Marine Division be permitted to operate a Division Hospital with complete medical and surgical facilities during the preparatory period so that the surgeons would have an opportunity to
16
exercise their skills.

14. Action Report, ComGen Headquarters, 5th Marine Division, 28 April 1945, p. 245.

15. 5th MarDiv, pp. 245-246.

16. ComGen Headquarters 4th Marine Division, Fleet Marine Force, pp. 243-245.

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Medical organization provided for the Iwo Jima operation was as follows: (1) Each of the three Marine divisions (3rd, 4th and 5th) included their normal complement of attached medical troops plus one medical battalion (H & S and five medical companies) per division; and (2) the Landing Force was supported by the following Corps medical units: (a) V Amphibious Corps Medical Battalion consisting of H & S (Headquarters and Staff) and three medical companies (28 officers and 310 enlisted men), plus the Mobile Blood Bank Facility (1 officer, 2 enlisted), and the Navy Field Medical Photographic Unit #3 (1 officer, 4 enlisted); (b) Corps Evacuation Hospital #1 (28 officers and 222 enlisted); (c) 38th Field Hospital (Army) (17 officers and 190 enlisted); and (d) "D" Company of the 3rd Marine Division Medical Battalion. This last named unit was temporarily detached from the 3rd Division and assigned as medical reinforcement to the OZARK (LSV2) as a reserve medical facility at night after the retirement of the transports from the target area. Her capacity was estimated at 450 casualties.¹⁷

Rehearsal for the operation by the units of the V Amphibious Corps was conducted between 11-18 January 1945. On 11 January, Corps Headquarters was established aboard the AGC 10. One medical unit, the Corps Medical Battalion, was embarked during the rehearsal; but it did not land. Divisional medical

17. V Phib Corps, p. 415

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units received some training in the handling of simulated casualties during the rehearsal. The landing troops of each APA had 40 officers and men designated as simulated casualties, while the landing troops of each LST had 10 men so designated. Each APA was designated to receive 15 litter and 10 ambulatory casualties. Remaining casualties were left ashore to be cared for by the Landing Force. In the final days prior to embarkation, adjustments were made to correct observed and apparent deficiencies of the rehearsal. A series of exercises for combined and unit staff training were held. Final readiness details were worked out.¹⁸

Embarkation and Aboard Ship

Nearly ideal dispersion of V Amphibious Corps medical units and their cargo was obtained by embarkation in six APA's,¹⁹ three AKA's and one LST. Similar dispersion was provided in the case of the medical units of the Marine Divisions. In general, medical personnel were embarked with the RCT (Regimental Combat Team) and Support Group units to which attached, on transports and smaller craft, as designated by the unit²⁰ medical officers.

18. V Phib Corps, pp. 415-416.

19. V Phib Corps, p. 416.

Note: For embarkation chart showing dispersion of Corps medical units, see Appendix C, p. 438.

20. 4th MarDiv, p. 245; 5th MarDiv., p. 246.

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In the case of the 4th Marine Division, the different companies of the Medical Battalion were embarked on six APA's. When practicable, hospital sections of the medical companies were embarked on ships having the largest casualty capacity, to facilitate the care of casualties received on board during the initial stages of the battle. One medical officer and two corpsmen were embarked on each of the LST(H)'s, which were to serve the Division to act as liaison medical personnel for the period during which these ships were to remain on stations at the target. Basic vehicles were combat-loaded with essential items of equipment and supplies to supplement that designated as "hand carry". Seabags were packed with battle dressings, plasma, serum albumin, and other items essential in the early stages of the assault. These were loaded in troop spaces, to be carried ashore by assault medical troops. Two and one-half ton 6 x 6 trucks, for the first time part of the Medical Battalion, were combat-loaded with equipment and supplies essential in establishing surgical units ashore. RCT (Regimental Combat Team) reserve medical resupply items were loaded as designated, with the advice of unit medical officers. Attached medical companies carried an additional reserve, which was loaded on ships to which they were assigned. The remaining Medical Battalion equipment and supplies were divided between two APA's and an AK. H & S Medical Battalion carried a division reserve in addition to that loaded by RCT's and medical companies. The

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loading priority given medical equipment proved generally satisfactory.²¹

Enroute to the staging area, individual training of personnel aboard ships was prescribed. The integration of medical and military plans was reviewed by medical officers, particularly between opposite members of the Landing Force and the Attack Force. Organizational training within the limitations imposed by shipboard facilities was carried out. During the period 11-13 February, while at the staging area, a simulated landing operation, in which the troops debarked but did not land, was carried out. Medical units with the assault waves received training in debarkation.²²

During the trip to the combat area, there was very little sickness. Hygienic and sanitary conditions aboard ships were satisfactory. The greatest cause of disability was fungus infection of the feet, hands, and groin. No outbreaks of food poisoning, dysentery, or other serious diseases occurred. There were very few malingerers.²³

21. 4th Mar Div, p. 246.

22. V Phib Corps, p. 416.

23. 4th Mar Div, p. 247; 5th Mar Div, pp. 246-247, p. 263.

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Landing and Establishment of Medical Units

The 4th and 5th Marine Divisions, supported by the Fifth Fleet war ships and planes, began landing on the south-east shore of Iwo Jima at 0900, 19 February 1945. The 3rd Marine Division, which had been held in floating reserve, was landed on D-day plus two. During the initial stages of the assault, the medical services were provided entirely from those divisions. Medical personnel attached to Regimental Combat Teams debarked as directed by unit commanders. In general, Company Aid men were boated with platoons; Battalion Aid Station personnel, with Battalion Command Posts; and Regimental Aid Station personnel, with the Regimental Command Posts to which they were attached. Shore Party Medical personnel in support of Battalion Landing Teams were boated prior to H-hour. In the case of the 4th Marine Division, personnel of the assault landing teams went ashore between H plus 3 and H plus 90 minutes (0903 to 1030) on D-day. Reserve Landing Teams and Regimental Command Posts of the two assault combat teams were landed by H plus 265 minutes (1315). Four Medical Shore Party evacuation teams were landed between H plus 30 and H plus 120 minutes (0930 to 1100).²⁴ Other Division and Corps medical units²⁵ were landed as rapidly as the military situation would permit.

24. V Phib Corps, p. 416.

25. V Phib Corps, pp. 416-418.

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Regimental and Battalion Aid Stations were set up within the perimeter of their respective Command Posts. On D-day plus 1, some of them actually located in the front lines. In the early phase of the assault most aid station personnel were separated into small groups and worked in shell craters or foxholes dug in the sand. ²⁶

The experience of 26 battalion corpsmen under Lieutenant Sidney Bond (MC) USNR and Lieutenant (jg) William McHugh (MC) USNR was typical of hundreds on D-day. They landed in the sixth wave of troops, immediately following the assault group. Their chief pharmacist's mate was shot in the jaw as he stepped out of the landing boat and evacuated himself by going out with the boat again. The party, carrying seabags full of medical supplies, pushed inland some 75 yards and picked a spot in an antitank ditch for their station. They left some of the bags on the beach on that first trip; and, when the men went back to get them, many of the bags had already been ripped by shell bursts. Boxes of valuable plasma were smashed; but the worst blow was that one of the boats, carrying all their litters, had been sunk on the way in.

Wounded men were lying all around. It was impossible to stand erect on the beach, and the corpsmen crawled from casualty to casualty to bandage wounds and administer morphine and plasma. Within an hour after the aid station had been set up, a shell exploded at one side and fragments from it slashed into several of the men. Doctor McHugh, a big, young, bluff Irishman, swore at the bad luck.

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He at once realized that the revetment, which had seemed to offer good protection, was just as logical a target for Jap guns as it had seemed a site for an aid station. He ordered the men to pack up the equipment; and in a few minutes they had moved the station, this time to a large bomb crater.

Without litters the corpsmen found it very hard to carry casualties. They turned ponchos into improvised stretchers with rifles secured at each side as carrying handles. At best the corpsmen could only work the wounded back in jumps and starts, stopping in shellholes to get their breath. Some of the corpsmen, who normally would have gone inland in search of casualties, did not get off the beach, for the wounded never stopped coming back. One company corpsman, Kenneth W. Keene, PhM3/c, crawled to the aid of a wounded officer and found himself pinned down by a machine gun for three hours and a half.

"I received an urgent call for a corpsman to treat ten wounded men who had no corpsman," Keene told afterward. "A BARman (Browning Automatic Rifleman) and myself crawled from our hole to find the casualties. We found and treated eight of the ten when we were again pinned down by two more machine guns."

Somehow Keene managed to treat the two remaining casualties and then made his way to a partly demolished blockhouse, where he took shelter during an artillery barrage. Not until late afternoon did he make contact with his company.

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The situation for certain battalion corpsmen became even more confused when a Navy shore party, transferring the wounded from the beach to ships, took a direct hit and lost 15 out of 17 men. The battalion crew then had to set up their own evacuation. Boats could not always get through to pick up casualties and the corpsmen had to dig foxholes for the wounded. Their own numbers were reduced by the intense fire; one corpsman was shot and killed in the very act of dressing a casualty.

In the fury of the battle there were many dramatic instances of rescue and treatment. One Marine, blinded and with both hands blown off, was groping his way pitifully toward the beach when a corpsman saw him and ran a gantlet of fire to get him to safety. Another corpsman, a 35-year-old former railroad detective, and in battle for the first time, sewed four chest wounds under fire and undoubtedly saved the lives of all four injured men. But the wounded kept streaming in. Some were killed while awaiting evacuation after they had been treated. There was no place to take them for protection. One corpsman crawled to the aid of Captain Dwayne E. "Bobo" Mears, who had been shot through the neck and had collapsed from loss of blood. He buried the lower part of the captain's body in the sand so he would offer a smaller target for Jap riflemen. It helped, but the captain died later aboard a hospital ship.

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Dr. Bond's group had lost 11 of their 26 men by nightfall.

28

These casualties were higher than those of most of the assault units.

As the front lines were advanced, the aid stations were set up generally in defilated areas from 100 to 400 yards to the rear. Insofar as possible they were located so as to take advantage of the natural drift of wounded, and from 10 to 50 yards from the roads.²⁹

Medical supplies and equipment were landed by means of LCVP's, LVT's, LCM's, and LSM's. Those urgently needed by assault medical troops were sent ashore when requested. Otherwise they were landed in accordance with unloading priority. In the case of 5th Medical Battalion, all medical supplies and equipment were collected on the beach and carried to a Battalion Medical Dump, where Division and Company medical supplies were divided for further distribution. Most of the supplies had to be carried from the beach by LVT's, since the roads did not permit the operation of wheeled vehicles until D plus 5. The collection and movement of supplies³⁰ by the shore party were well handled.

28. Raymond Henri, et al., The Marines on Iwo Jima, pp. 38-40.

29. 5th MarDiv, p. 247.

30. 5th MarDiv, p. 266; 4th MarDiv, p. 248.

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The Battle Afloat

While the Navy Medical Department was striving to operate regimental and battalion aid stations, to establish hospitals, and to set in motion its chain of evacuation at Iwo Jima, medical officers and corpsmen aboard the 495 ships employed by Task Force 51 during this campaign were called upon to care for the casualties occurring on these vessels, and to provide emergency care for land force casualties. Battleships, cruisers, aircraft carriers, destroyers, mine vessels, patrol vessels, auxiliaries, landing ships, landing craft and other miscellaneous craft participated in the Iwo Jima operation, and each had its detailed medical plan. Aboard the larger ships, considerable space was allotted to the medical department for sick bays, operating rooms, and wards, and for the storage of medical supplies. These supplies were widely distributed, and battle dressing stations were set up at strategic points throughout the ships where prompt first-aid could be given to casualties. Adequate Medical, Dental, and Hospital Corps personnel were assigned to each type of ship to meet any emergency. A program of instruction was instituted for all personnel in the Medical Department and the men were rotated in their duties so as to get a maximum amount of training:

31

When the Medical Department of one of these fighting ships was suddenly faced with the responsibility of treating a large number of wounded men under battle conditions, it was

31. Commander Task Force 51 (ComPhibsPac) of 19 May 1945, pp. 15, 237-239.

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prepared. The wounded were taken to the nearest battle dressing station, where they were classified in terms of the urgency of their cases. When necessary, volunteer crewmen were employed as stretcher bearers so as to release corpsmen to assist in caring for the wounded. Aboard many of the vessels blood banks had been set up so that whole blood was available for the more serious cases. As a result of direct enemy shell hits aboard the heavy cruiser, USS PENSACOLA, 3 officers and 14 men lost their lives, and 120 officers and men were wounded. Through prompt and effective medical care, not one of those surviving the first hour died. Emergency treatment was given to the more seriously wounded first. Follow-up treatment on all cases continued until patients could be transferred. Conditions were such that no patients could be transferred for four days--because of the absence of facilities at first, and later because of the crowding of the existing facilities by shore-based casualties. The subjection of severely wounded men to continued operational conditions was highly undesirable, but they received medical care of a high quality aboard the PENSACOLA. Two members of the Medical Department were wounded at their battle stations. One of them, although wounded in the thigh, continued to carry out his duties for two hours until ordered to bed by the medical officer of his station. All members of the Medical Department contributed to the care of the wounded to the utmost during the four days the casualties were aboard, resting only when exhaustion made rest mandatory. Members of the ship's company rendered excellent aid to the wounded and cooperated fully with the Medical Department.

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Transportation of the wounded from the scene of injury was rapidly and carefully effected by non-medical personnel. Supplies were adequate as a result of their judicious dispersal throughout the ship; and though the sick bay received a shell hit, there was very little interference with the early treatment of casualties. Destruction of stores in the sick bay area was not sufficiently great
32
to affect the care of the wounded.

Following a 6" shell hit on the destroyer, USS TERRY, the crew members showed great proficiency in giving the wounded first-aid. The quality of this care was remarked upon by several medical officers who were visiting aboard the ship at the time. Frequently a medical officer would get to a wounded man only to find that his hemorrhaging had been checked, morphine given, and shock treatment skillfully applied. This degree of efficiency was achieved as a result of tedious hours of first-aid which had been given to the
33
whole crew over and over again.

Although deaths and injuries aboard such ships as the KEOKUK (AKN4), the BISMARCK SEA (CVE95), the PENSACOLA (CA24), the SARATOGA (CV3), and certain of the landing ships were heavy, facilities for handling them were adequate, and the wounded were given
34
effective medical care. Burns were treated with morphine, plasma,

32. Action Report, USS PENSACOLA (CA24), 4 Mar. 1945, pp. 69-71.

33. Action Report, USS TERRY (DD513), 7 Mar. 1945, p. 17.

34. CTF 51, pp. 239-240.

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sterile vaseline dressings and oral sulfathiazole. Shell wounds, including compound fractures, were treated successfully by debridement, sulfa powder, vaseline packs, plasma, and oral sulfathiazole. Casualties were kept aboard the larger ships on which they occurred. The smaller vessels provided the wounded with first-aid and then transferred them to any convenient ship which could take them. The USS TERROR (CM5), for example, took 58 cases from an LCI group. Due to the necessity for not impeding combat operations, transfer to larger ships was sometimes slow, and often entailed repeated handling by small boats. Medical supplies afloat were sufficient throughout the
35
operation.

In cases of emergency, the combat ships were called upon to pick up casualties and provide them with medical treatment until they could be transferred to APA's or AH's. At 1700 on 6 March, the mine sweeper, USS HOPKINS (DMS13), received orders to pick up a group of Marine casualties and give them supportive medical treatment until arrangements could be made for their transfer to an APA. A total of 38 men were received-- three stretcher cases, one ambulatory, and the remainder psychiatric cases. These men had been embarked in DUKW's since noon, and had been vainly searching for a transport to accept them. The wounded had received only emergency first-aid and were in need of immediate medical treatment. After they received supportive medical treatment, the patients were provided with a hot meal; and as soon as the necessary arrangements could be made, they were

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transferred to the USS DOYEN (APA1).

Naval casualties occurred sporadically from D minus 2 throughout the operation. There were 188 killed, 608 wounded, and 451 missing in action, making a total of 1,247 casualties.

Care and Evacuation of Casualties

The care and evacuation of casualties during the Iwo Jima campaign was better handled than in any previous operation in the Central Pacific area. Notwithstanding the extreme bitterness of the combat over a prolonged period and with a casualty rate which averaged in excess of 1,000 per day during the first 21 days, evacuation functioned as a well-integrated and coordinated operation in which the wounded received the best medical care commensurate with the military situation. By D plus 33, a total of 17,677 casualties had been evacuated.

36. CO. USS HOPKINS (DMS13) of 10 Mar. 1945, p. 11.

37. CTF 51, p. 237.

Note: A summary of naval casualties by ships is given in Appendix D.

38. V Phib Corps, pp. 418-419; Inspection Report, Rear Admiral R. H. Laning (MC), U.S. Navy, "The Medical Department in Detachment (Iwo Jima) Operation", to the Chief of the Bureau of Medicine and Surgery, 11 Mar. 1945.

39. V Phib Corps, pp. 418-419.

Note: A summary picture of casualties and their evacuation is presented in Appendix E. For a detailed picture see Appendices F through K. Appendix F gives landing force casualties; Appendix G, casualties evacuated from beaches to ships; Appendix H, casualties screened by LST(H)'s; Appendix I, naval battle casualties; Appendix J, ships departed from target area with casualties aboard; and Appendix K, casualties evacuated by air.

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Evacuation was carried out along the normal established chain. Casualties were brought down from the firing line by hand-carry, jeep, ambulance, half-track, and weapons carriers. Because of the rugged terrain, hand-carry frequently had to be employed to move the wounded over the rough laval cliffs and sharp edged blocks of rock and lava to the beachhead.⁴⁰ While the beachhead was being secured, casualties were evacuated from Battalion Aid Stations directly to the beach where they were turned over to shore party and beach party installations which were set up in shell holes or in small pits dug in the volcanic sand. Plasma and other first-aid measures were given while bullets were whizzing by and mortar shells were bursting in close proximity. This decentralized plan for the care and evacuation of casualties worked well under extremely trying conditions. Boats bringing personnel and supplies ashore were quickly loaded with wounded for the return trip. However, the surf conditions were such that many boats were broached and many were blown out of the water by enemy artillery or mortar fire.

Even after the troops were well established on the beach, the distance from the Battalion and Regimental Aid Stations to the beach was so short that casualties were usually evacuated directly from these stations to the beach until divisional and corps hospital installations were interposed in the chain of evacuation about D plus nine days. After these installations were set up

40. Memorandum Report to Rear Adm. Rockwell by Lt. Comdr. Mackenzie, 16 Mar. 1945, p. 44.

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evacuation was from Battalion and Regimental Aid Stations to the Division Hospital and from there to the beach or to Corps Hospitals. Casualties were so high and space to set up hospitals was so limited, as well as subjected to intermittent enemy fire, that many of the hospital sections of the medical companies supporting the Regimental Combat Teams were landed early and remained on the beach to assist in the beach evacuation stations until division and corps hospital installations were functioning. Initial treatment of casualties in Regimental and Battalion Aid Stations was excellent. Wounds were dressed and shock and hemorrhage were treated so efficiently that many casualties who could otherwise have died reached the Shore Evacuation Stations and Divisions and Corps hospitals. In addition to the use of morphine and plasma, a large amount of serum albumin was used and proved to be very effective in the early treatment of shock and hemorrhage. Front line medical units found that serum albumin was exceptionally well suited to their needs because of the ease of administration, small bulk, and the marked systemic response to it by casualties requiring additional blood volume. It was found to sustain casualties as well as plasma until facilities⁴¹ for whole blood were available.

Casualties among corpsmen were very high, especially among front line units. In moving about to care for the wounded, corpsmen were subject to intense enemy fire and frequently were shot down

41. 4th MarDiv, p. 259, V Phib Corps, p. 427.

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alongside the man they were caring for. For the Iwo Jima operation, each division was assigned approximately 5 percent more corpsmen than were provided for by Tables of Organization. Even this was insufficient; in one Marine Division (4th) losses among corpsmen were approximately 38 percent; and even though losses were a little less in the others, there was urgent need for replacements. Medical companies had to be levied on to furnish these. In one division this policy was carried to such an extent that by D plus eight days one medical company had been reduced to three Medical Officers, and a few Marines and was almost inoperative as an organization. This practice was contrary to established doctrine and hindered the care of the wounded, since it sometimes left insufficient personnel in other areas to care properly for the wounded after they were evacuated from the front lines.

In the normal movement of casualties from a combat area by ships, the responsibility of the land forces ends at the high water mark on the beach. In an amphibious operation, however, sea evacuation is so closely linked to the shore activities and exerts such a profound influence on the field hospitalization program ashore that the two are nearly inseparable. At Iwo Jima, hospital installations ashore were subjected to the hazard of enemy artillery and sniper fire, and there was so little room in which to set them up that every effort had to be made to get the casualties off the

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Island as rapidly as conditions permitted. The beach conditions resulting from high surf, a steeply sloping beach, and the volcanic ash into which men sank to their ankles or deeper at each step, did not always allow evacuation to proceed smoothly. Even wheeled vehicles frequently bogged down.

Often the surf was so heavy that small craft could not beach and then pull off again without broaching; consequently much of the casualty evacuation was by DUKW's, Amphibian Tractors, or LCM's. Since the amphibian vehicles were badly needed to haul ammunition, water, rations, and supplies to the assault units, it was frequently difficult to obtain them for transporting casualties. Several times it was necessary to change the evacuation from the Eastern to the Western beaches and back again, as surf conditions rendered the beaches on one side or the other inoperative. In contrast to previous operations, evacuation continued throughout the day and night from the first, and no casualty was kept on the beach for more than a few minutes unless being treated for shock.

Close liaison between the Attack Force Surgeon afloat and the Landing Force Surgeon ashore resulted in a reasonably well-coordinated and smooth transition in the chain of evacuation from shore to ship. On D-day, 19 February, 30 APA's, 12 AKA's, one

43. CTF 56, pp. 313-315; V Phib Corps, p. 420.

44. 4th MarDiv, p. 232.

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LSV OZARK, and four LST(H)'s were available for the evacuation of casualties.⁴⁵ The general plan for sea evacuation provided for an LST(H) to be stationed 500 to 2,000 yards off each of the four beaches, and all casualties were to be evacuated to one of these ships.⁴⁶ The LST(H)'s took station on HOW minus 30 and functioned the first day as follows:

<u>LST</u>	<u>Retained on board</u>	<u>To APA's</u>	<u>Total</u>
929	21	229	250
930	35	460	495
931	10	221	231
1033	12	242	254
			<u>47</u>
	Total casualties		1230

45. CTF 53, p. 72.

46. Appendix A gives the plan for the use of LST(H)'s in the medical chain of evacuation. They were employed for the first time in the Iwo Jima operation. (Memo to Rockwell, pp. 45-57).

47. CTF 51, p. 235.

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During the early phase of the assault and prior to the establishment of fully functioning shore evacuation stations, the primary duty of the LST(H)'s was to render shock therapy and apply splints and dressings.⁴⁸ Another valuable service rendered by the LST(H)'s during this period was the reception of casualties evacuated at night. In previous operations, casualties had been known to float around all night in open boats looking for a ship to receive them. After shore evacuation stations were established, the main purpose of the LST(H)'s was to effect an equitable distribution⁴⁹ of casualties to APA's and AH's.

The work performed by the LST(H)'s can be best understood by following one of them into action. LST(H) 931 was typical. This ship which served the Blue Beaches was stationed approximately 400 yards off shore. A pontoon barge was tied alongside for receiving the casualties. A Jacobs ladder led from the barge to the main deck of the LST. The barge was propelled by an outboard motor which was used whenever the LST changed station, as it was obliged to do whenever shore fire began to bracket it or when tide conditions required. On the barge was a small covered area which served as a supply shack. A number of litter bearers, two doctors and a talker to communicate with the control tower of the ship were stationed on the barge. Casualties came alongside the barge in

48. CTF 51, p. 235.

49. 4th MarDiv, pp. 232, 253.

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LCVP's, LCM's and Amtracks. As each boat came alongside, it was temporarily made safe; and the doctor on duty boarded it and looked over the wounded. Casualties requiring immediate attention were taken aboard the barge, after which the boat was directed to a transport or hospital ship. A recorder logged the name of each casualty, together with his serial number and his destination. Casualties taken off were moved to the barge by hand, there being four stretcher bearers present for his work. This transfer was accomplished without difficulty even in high seas. Such casualties were either reloaded into a more suitable craft for further transfer to the transport, or were retained on board. Immediate treatment, such as the control of hemorrhage, was carried out right on the barge. Cases needing urgent treatment for shock or immediate surgery were loaded aboard the LST(H) by tractor crane. This crane was mounted on the main deck, just aft of the cargo hatch. It lowered a metal frame to the barge, picked up as many as three stretchers, and then lowered them directly into the tank well. The cargo hatch was always open, and was surrounded by lines painted with luminous paint to prevent accidents during the black-outs.

The forward area of the tank deck was reserved for the non-serious cases; the after area, for pre-surgical cases; and amidships, for the most serious cases. About 200 to 225 cases could be cared for on the tank deck; ⁵⁰ another 150 to 175, in

50. The method of bunking casualties on the tank deck of an LST(H) is shown in Appendix L. (Memo to Rockwell, p. 59).

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the troop quarters. Patients for operation were hoisted from the tank deck through a designated scuttle which was always kept open. They were then moved forward to the operating room and down to the tank deck again through another scuttle. One way traffic only was used along the corridors on the port side. The operating room had two tables in it so that two cases could be operated on at once. For surgery, straight ether or sodium pentothal was used exclusively as an anesthetic. The latter was used in 2.5 percent solution, never more than 80 cc. (2 Gms.) being used. Whole blood was kept in the vegetable locker. This ship used thirty-seven (37) pints in the first twenty-four hours, while caring for 628 patients. Plasma was used in far larger quantities. The normal complement of LST(H) 931 was four medical officers and twenty-six corpsmen, but there were six medical officers and thirty-four corpsmen on board during the operation. It was the feeling of the ship's medical officers that even this number was insufficient, and that eight⁵¹ medical officers were needed on board an LST(H).

The use of LST(H)'s as evacuation control ships, although representing an important step forward in the chain of evacuation, left much to be desired. These ships were used to bring LVT's to the target, and were converted for casualty handling only after these had been unloaded. As a result, the ships were covered with dirt and grease when turned over to the medical department. The

51. Memo to Rockwell, pp. 39-43.

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illumination on the tank deck was usually very poor and the operating facilities were unsatisfactory. The medical personnel assigned to them was not sufficient to care for the large number of casualties even when the staff worked day and night. On D day from 0900 to 1530, a total of 2,230 casualties were evacuated through the LST(H)'s -- this was an average of slightly more than three casualties per minute. After a few days and nights of this, the medical officers and corpsmen were exhausted. Another complaint was that the barges anchored alongside the LST(H)'s were unstable. At times the barges would rise on a swell to the level of the LST deck, and on one occasion some of the barges had to be cut loose. In spite of the wide dissemination of information by letter, conferences, and medical plan of the function of the LST(H)'s numerous casualties by-passed these ships in the chain of evacuation.

The APA's bore the brunt of the initial casualty load from the beach assault. In the Iwo Jima operation they had received 4,956 wounded by 1745 of D plus 2 days. Since the transports were not designed primarily to facilitate casualty handling, they were not properly equipped for this purpose. Their primary function was to carry and land combat troops, equipment, and supplies. As soon as this mission was accomplished they left the area. However, on most of these ships the Captain and ship's company gave valuable assistance in handling the large number of

52. CTF 56, pp. 315-316.

53. CTF 51, p. 236.

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casualties. Some of the APA's received a great number of casualties in a very short time and their medical staff labored long hours to give them the attention that they needed. The Casualty Evacuation Officers on the Casualty Evacuation Control LST(H)'s endeavored to distribute the casualties among the different ships so that no one transport would be overburdened at any time. Unfortunately, this did not always work out. Sometimes the coxswain failed to heed the directions given him or misunderstood them, and sometimes when he arrived at a designated location the ships were not there. On a few occasions the ships refused to take casualties for one reason or another and the boats were obliged to go from one ship to another before their casualties were taken aboard. In such cases casualties did not receive effective treatment for many hours after they should have received it. Some casualties spent as much as eight hours in small craft before being taken aboard ship. A certain amount of this confusion is a part of war and could not have been avoided. But it was felt that a more effective organization would have resulted if every Officer of the Deck had been required to report to the Captain of the ship when casualties were alongside, and if any Captain who refused to take a boat load of casualties aboard his ship had been required to make an immediate report to the Task Force Commander giving the reasons for his refusal.

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54. CTF56, pp. 316-317.

Note: A detailed picture of medical personnel, supplies and equipment, and care of casualties by a typical transport squadron (ComTransRon 15) is given in appendix M.

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The experience of APA 118 will serve to illustrate the role of the transports in casualty evacuation. APA 118 dropped anchor in Transport Area Baker, about 20,000 yards off shore, on D day and unloaded its troops on schedule. It then moved in to about 4,000 yards from shore and began unloading cargo and supplies. At about 1400 on D day the first casualties were received aboard. The majority of them were severely injured and required emergency treatment. During the next few days casualties were loaded aboard the ship in groups of from 3 to 75. Throughout much of this period the medical staff worked day and night operating on and caring for the casualties. As a general rule the ship withdrew out to sea at night, but on two occasions it anchored about a thousand yards off shore and protected itself by means of a smoke screen. Each night except D plus one there was a red alert because of enemy planes, but APA 118 suffered no damage.

On 25 February, after the ship had received a full load of casualties - approximately 225 - it departed from Iwo Jima in convoy with eight other transports and proceeded to Saipan, which was reached on 28 February after an uneventful trip.

The large number of wounded at Iwo Jima again emphasized the need for a greatly increased number of hospital ships. Two hospital ships were originally scheduled for the operation. Commencing on D plus one, these ships, the SAMARITAN (AH10) and

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SOLACE (AH5), inaugurated a series of shuttle trips between Iwo Jima and Saipan or Guam for evacuating casualties. The work of these hospital ships was augmented by the PINCKNEY (APH2), the BOUNTIFUL (AH9) and the reserve hospital ship, OZARK (LSV2), all of which made one round trip each.⁵⁶ A total of 4,879 casualties had been evacuated on these ships by 21 March (D plus 30).⁵⁷

Since the only function of the hospital ships was the transportation and care of the sick and wounded, their loading and unloading and destination was not complicated, as in the case of transports, by the many factors related to the combat situation. Moreover they were able to provide for better facilities for the care of the sick and wounded than any other type of ship. If some of them could have remained in the area during early phases of the operation to care for the slightly wounded, many casualties could have been returned to duty in a few days, thereby preventing the enormous loss of manpower occasioned by their departure aboard hospital ships and transports to Saipan or Guam.⁵⁸

Air evacuation from Iwo Jima to the Marianas supplemented evacuation by hospital ships and transports. This service

56. CTF 51, p. 32.

57. CTF 56, pp. 329-330.

58. CTF 56, p. 317.

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was initiated on D plus 12 days and was originally planned to accommodate 350 patients per week. However, the very high casualty rate, together with the shortage of ships available for transporting casualties, caused this figure to be revised to the point where half or two-thirds of the planned weekly evacuations were being carried out daily. There were times when, as a result of unfavorable sea conditions or lack of facilities afloat, air evacuation was the only means of getting casualties off the

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island. An air evacuation unit consisting of two flight surgeons and several hospital corpsmen arrived with the first casualty evacuation planes and set up near the north end of Number One Airfield in the 3rd Marine Division area. All casualties to be evacuated by air were screened by them and were accompanied on the plane by corpsmen. The unit and the planes were subjected to enemy fire at times; for example, two evacuation planes were hit on the take-off, but were able to land and transfer their load without additional casualties. In spite of such difficulties, the unit did an excellent job of evacuating large numbers of wounded. By 21 March (D plus 30), a total of 2,393 patients had been evacuated by air. The casualty evacuation planes also brought in whole blood from Guam, as it was needed by land forces.

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59. V Phib Corps, p. 421.

60. CTF 56, pp. 312, 329-330.

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The weakness of any evacuation policy was again demonstrated at Iwo Jima where a 15 day evacuation policy had been established. In the early stages of the invasion there was no place to segregate casualties who would be ready for duty in 15 days or less. When casualties were being evacuated over the beaches by the hundreds - beaches that were under heavy enemy fire, clogged with transportation and equipment of all kinds - wounded were evacuated by the first available transportation, and sorting was not feasible. Time, space, and the combat situation did not permit convalescent camps to be established. Such beds as were available ashore were needed for those seriously wounded who required trained care at all times if their lives were to be saved. Wounded were not evacuated even from the front lines until medical personnel had put them into condition to endure the movement to the rear. Hours and days ashore were often required before certain types of patients could be evacuated by any means. The medical officers on the spot felt that this problem could be solved for the early stages of an operation of this type by having sufficient ships or transports to allow two or more to be retained in the area to receive slightly wounded by inter-ship transfer. In operations of longer duration it was suggested that the sick or slightly wounded be cared for by having a sufficient number of hospital beds on nearby friendly islands to hold those casualties until they were ready for duty and return to the area. Medical officers believed that such a program would prevent the dangerous depletion of trained and experienced fighting men.

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There were a number of other ways in which the effectiveness of the chain of evacuation might have been improved. For the first few days of the operation the communication system was not fully satisfactory. The casualty evacuation officers aboard the LST(H)'s did not receive the reports as to which transports were available for loading casualties; as a result certain ships received more than their share for a time, while others were given very few casualties. Another difficulty in the evacuation set-up was occasioned by the great difficulty which ambulance craft experienced in finding the proper vessels. In many cases the APA's stood well off shore, and during rainy, rough, and foggy weather they were difficult to contact. By the time the ambulance craft had reached the approximate station where the transport was supposed to be anchored, the ship in some instances would already have moved. This necessitated hailing other ships and asking them for further directions.

Despite difficulties such as these, the chain of evacuation operated more smoothly than in any previous action in the Central Pacific. It was felt by medical officers that the use of LST(H)'s in this action as casualty evacuation ships represented a most important addition to the scheme of medical care. It unquestionably saved many lives.

One of the most significant innovations in the whole chain of medical evacuation was the use of fresh whole blood,

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packed in ice, and flown directly to the operation. While large quantities of plasma were also used, it could not take the place of whole blood -- especially in caring for hemorrhage cases. On many of the APA's which participated in the operation, lists of voluntary donors aboard had been compiled, so that when the regular whole blood supply was exhausted, donors could be called upon to furnish additional blood.

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Hospitalization

The establishment of hospital facilities ashore at Iwo Jima was delayed by the very limited space available, the difficult beach conditions which interfered with the landing of supplies and equipment, and the constant hazard of enemy artillery and sniper fire. As a result, nearly all hospitalization had to be provided by the units afloat until about D plus 9. During the early days of the operation, effective hospitalization was provided by four LST(H)'s, acting in somewhat the capacity of field hospitals; the auxiliary hospital ship, OZARK (LSV2); the hospital ships SAMARITAN and SOLACE; the hospital transport, PINKNEY, and the medical departments of some of the APA's.

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Companies from the Corps and Division Medical Battalions began landing on D plus 1 and continued to go ashore as needed. Sites were

62. Memo to Rockwell, pp. 39-43.

63. Inspection Report of Rear Admiral R. H. Laning (MC), USN; V Phib Corps, pp. 417-418.

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picked for hospitals and facilities set up as rapidly as the military situation would permit. The first unit to establish itself ashore was Company A of the V Amphibious Corps Medical Battalion. Company A had landed on D plus 6, and had begun to set up an operating room and 40 beds, with provision for expansion, just south of Green Beach. After an area had been allocated by the Shore Party Commander, bulldozers were provided to dig in the operating room and ward tentage. Within eight hours at 1600 on D plus 7 - this unit was established with 110 beds, and receipt of casualties was begun. The other companies of the Corps Medical Battalion were landed during the next few days and additional hospital facilities were set up. The combined bed capacity for the units of the V Amphibious Corps Medical Battalion was 310, of which 187 were the combined maximum occupied on any one day.⁶⁴

A neuro-surgeon and an ophthalmological surgeon were included in the staff of the Corps Medical Battalion and the services of these specialists were made available for all troops engaged in the Iwo Jima operation. The Corps Medical Battalion also had a neuro-psychiatrist on its staff. His services were augmented by those of a neuro-psychiatrist from the 4th Marine Division. By pooling the available neuro-psychiatric facilities and sending all definite neuro-psychiatric cases from every unit to them, these cases were handled more efficiently than in previous operations. Under this centralized organization, it was possible

64. V Phib Corps, pp. 417-418, 423.

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to screen all borderline NP - combat fatigue cases and give appropriate treatment to each type of patient.

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The medical battalions of the 4th and 5th Marine Divisions both began to operate their field hospitals on D plus 9, while Corps Evacuation Hospital #1 and the 38th Field Hospital (U.S. Army) were established on D plus 12.

A detailed account of the activities of the 4th Marine Division Hospital will serve to illustrate the work of the hospital units at Iwo Jima. On D plus 6 the Division Surgeon and Commanding Officer of the Medical Battalion located the site for the 4th Marine Division hospital on the eastern edge of Airfield No. 1. Running through this location was a good road to the front lines and to the evacuation beaches. On either side of the road were uncovered water reservoirs - 15' by 8' - below the surface. These reservoirs had concrete docks and concrete walls 8 inches thick. Of the five, two had been badly damaged by naval gunfire. A considerable amount of sniper fire was encountered in this area from the high ground in the rear of the front lines. In addition to bulldozing trenches for ward tents, therefore, a large amount of ground was pushed to the north, further defilading the area. The 4th Engineer Battalion bulldozed five long trenches, providing space for 4 batteries of 6 storage tents each, one battery of 3 storage tents, and the Division Medical Dump. The depth of the

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trenches and deep sinking of the ridge poles placed the tops of the tents below the level of the revetments. The coolness of the climate permitted placing 6 storage tents in a line to form a ward. The water reservoirs proved ideal for operating rooms. The engineers constructed an entrance ramp, and erected a wooden framework over each. A tarpaulin stretched over this framework served as a roof. Two reservoirs were used as operating rooms, one as a receiving room, and the other two for H & S (Headquarters and Staff), Medical Battalion, and the Malaria and Epidemiology Control Team. Each reservoir provided ample space for two major operating tables. Many times, from D plus 9 until plus 20, while mortars were landing nearby, operations went on without interruption. Frequently doctors and corpsmen would observe, "Thank God for this place." An additional well-defiladed tent was set up to provide space for two major operating tables to treat compound fractures of the femur and tibia. Had it not been for difficult surf conditions, which materially delayed unloading of the medical company gear from APA's, the division hospital would have been functioning on D plus 7. As it was, the hospital was unable to receive casualties until D plus 9. Six major operating tables and 350 beds were available on D plus 15. The lack of sandbags constituted the chief difficulty experienced in setting up the wards. These were necessary to prevent the sides of the bulldozed trenches from caving in. This deficiency was partially compensated for by the use of lumber. The main road running through the area was watered several times daily by the engineers to keep down the dust. A

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tremendous amount of dust was blown over the hospital area from the airfield, but due to the complete black-out arrangement of the tarpaulins and tents, it did not infiltrate.

On the Iwo Jima operation, the flexibility of the five medical companies, and their ability to work together as an efficient single unit was admirably demonstrated. On D plus 9, D Medical Company, whose gear was not yet ashore, set up an operating room and receiving ward with the gear of B and C Companies. These latter companies had no need for it since they were employed in evacuation stations. Because of the vast amount of surgery, teams composed of two surgeons and six corpsmen were detailed from both B and C Companies. By D plus 14 the division hospital was staffed by three complete medical companies and surgical detachments from the other two. The spirit and unselfish devotion to duty of all doctors and corpsmen was highly commendable. No one thought of sleeping as long as casualties were arriving. The careful postoperative treatment rendered to all patients was particularly noteworthy. This Division was fortunate in having 12 surgeons who were capable of performing major abdominal and traumatic surgery. The operating teams were composed of two well qualified surgeons, rather than a surgeon and a relatively untrained assistant. The Division psychiatrist was loaned to Corps Medical Company A, where the combat fatigue cases of the three divisions were sent. He performed a valuable service, examining 700 cases. Of these he returned approximately 140 cases to duty.

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Only one of these cases developed a recurrent combat fatigue. The lack of an ophthalmologist was keenly felt almost every night. There was a large number of eye injuries, chiefly resulting from the sharp edged volcanic sand being blown into the eyes. Each night approximately two eye injuries would be sent to the Corps ophthalmologist; however this number taxed his capacity as the other two divisions were doing likewise. Remaining eye injuries were necessarily treated at the Division Hospital. An ophthalmologist was not only needed by each Marine division during combat, but was also required constantly during the rehabilitation phase.

In spite of the heavy casualties, hospital equipment and
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supplies were adequate. The Division Medical Dump was conveniently

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66. There was an insufficient number of large Kelly hemostats, intestinal clamps, and kidney pedicle clamps. The atraumatic intestinal sutures proved to be invaluable. There was a shortage of atraumatic sutures on a straight needle, and an additional supply was procured from the 38th Field Army Hospital. It was found that the majority of small intestinal repair work could be performed in half the time with a straight needle. The consensus of opinion of the 4th Marine Division surgeons was that the ratio issued should be three straight needles to one curved needle. More efficient laundry equipment was badly needed. A large volume of surgical linen was washed in three hand-operated washing machines, but the process was slow and inefficient. Drying of the laundry presented a major problem because of dust from the airfield. The new oxygen reduction valves functioned perfectly and proved invaluable, particularly in the treatment of chest wounds. An adequate supply of the large commercial oxygen cylinders was available. The York flake ice machine was set up in a receiving ward, but never functioned, since running water under pressure was required, and no pressure pump was provided, or could be procured on the island. Three portable Hawley fracture tables, which had been made by the Naval Construction Battalion while in base camp, proved invaluable. With these tables it was possible to apply plaster hip spicas to all fractures of the femur and massive lacerations of the buttocks and thighs.

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located in the hospital area. The surgical instruments of all five Medical Companies were utilized, permitting sterilization of sets of instruments while several major operations were in progress, and thereby materially lessening the delay between operations. Probably the most striking advancement of the Iwo Jima operation was the availability of whole blood and penicillin. The packaging of the whole blood was most efficient, as it remained cool and did not hemolyze even though some packages had been removed from the cooler at the blood bank as much as 24 hours before being used. A total of 668 pints were administered at the division hospital. At no time was the supply deficient. Men were stationed on the beach to meet all incoming craft, and guide equipment and supplies to the Division Medical Dump, and consequently the division suffered little loss.

Sanitation, because of the porosity of the soil, presented no major problem. Sunken barrels with prefabricated tops provided heads. Because of the time element and rapid turn over of patients, a complete galley was not set up. C rations were heated in a G. I. can, and tongue blades were used as spoons. Hot coffee was available. Water supply was adequate, being obtained from water trailers and 50 gallon drums.

Blackout entrances were provided for all operating rooms, receiving tents and wards, and a guard was posted on the central road to prevent any infraction of complete blackout discipline. Camouflage nets were spread over operating rooms and tents. A

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perimeter defense was set up using Marine personnel of the medical companies.

The Fourth Marine Division Hospital functioned for two weeks, from 1 March 1945 (D plus 9) to 14 March 1945 (D plus 23) inclusive, during which time 1,465 patients were admitted, and 126 major operations performed.

All of the hospitals set up on Iwo Jima gave each other mutual support. When one installation had more operative cases than it could promptly care for, the excess cases were directed to another hospital. These diversions were usually coordinated through the corps surgeon, but in some cases they were made directly by the hospitals themselves.

Health and Sanitation

The health of the forces which took part in the Iwo Jima operation was excellent and sanitation was generally satisfactory. The non-effectives increased gradually to approximately 4 percent by D plus 18, after which they remained generally at that level.

67. 4th MarDiv, pp. 261-265.

Note: A statistical picture of the work of the Fourth Marine Division Hospital is presented in Appendix N.

68. V Phib Corps, p. 425.

Note: An interesting picture of the hospital facilities provided at Iwo Jima is given in Appendix O. These figures indicate that once hospital facilities had been established ashore they were able to care for all casualties sent to them without difficulty. p. 439.

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No outbreaks of intestinal or communicable disease occurred and there were no epidemics. Neither the interrogation of prisoners nor the study and laboratory findings of the Malaria and Epidemic Control Teams revealed evidence of malaria, dengue, filariasis, typhus fever, cholera, plague, yellow fever, smallpox, diphtheria, or venereal diseases in serious proportions. Iwo Jima proved to be a remarkably healthy island from an epidemiological standpoint with its cool climate, porous soil, and absence of major sanitary hazards, such as swamps and malaria vectoring mosquitoes.

Due to indoctrination, the presence of men with previous combat experience, and intensive training in sanitation, routine sanitary measures were excellent. The early problems of sanitation were, in the order of their importance, disposal of the dead, disposal of human excreta, and disposal of ration tins and food remnants. American dead were sprayed with sodium arsenite at the earliest possible time and were buried in one of the three division cemeteries as expeditiously as possible. However, in some cases the spraying and collecting of the dead from pockets which had been isolated by intense enemy fire was delayed for several days. A problem of some proportions was presented by the necessity of disposing of large numbers of enemy dead. It was met by spraying with DDT or sodium arsenite and burial as soon as possible. Since it was not militarily feasible or practicable to centralize the collection and burial of enemy dead, they were buried wherever it was convenient.

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A great step forward in the maintenance of field sanitation was taken in this operation through the widespread use of DDT solution. In addition to hand spraying, its employment from aircraft was begun on D plus 9 using two carrier-based TBM's. On D plus 3, a request for air spraying of the area between gridline 72.5 and the base of Suribachi Volcano was refused on the ground that it was militarily unwise at the time. From D plus 9 on, DDT air spraying was continued at such times as the military situation permitted, and with consideration for the maximum security to the pilot and plane commensurate with the low altitude necessary to attain effective results. Notwithstanding, on one occasion, one of the C-47 planes was slightly damaged by enemy fire during one of its spraying runs over the northern part of the island. This fire apparently came from by-passed enemy troops. When indicated, respraying of certain areas was accomplished and special attention was given to particularly heavy fly breeding areas. On D plus 22 land based air spraying began, using C-47 type planes at Saipan. On 20 March (D plus 29) responsibility for DDT air spraying passed to the Island Command. The visible effect of DDT air spraying in killing the adult fly was immediate and striking in the areas covered. It was regarded as a valuable supplement to the indispensable and recognized hand labor procedures of field sanitation.

69.

69. V Phib Corps, pp. 431-432; CTF 56, pp. 323-324; USS MAKIN ISLAND (CVE93), 10 Feb. to 11 Mar. 1945, pp. 55,47.

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The Malaria and Epidemic Control Officer of the 4th Marine Division was given control of all airplane spraying of DDT over Iwo Jima. Continuous inspection of captured areas by the MECon Team (Malaria and Epidemic Control Team) in complete disregard of the intermittent enemy fire that enveloped all areas was highly commendable. The MECon Unit of the 4th Marine Division also supervised the spraying of 5 percent DDT in Diesel oil, in all Division galleys, hospital areas, the Division Cemetery, enemy food caches, pillboxes and caves, and many other indicated sites; set up a distribution center from which all units could obtain 5 percent DDT in oil as required; and questioned, examined, and made stool cultures and stained slides of all patients admitted to the hospital with gastro-⁷⁰intestinal symptoms and of all POW's (Prisoners of War).

Malaria and Epidemic Control Units performed a vital function in Pacific amphibious warfare. An enumeration of the work performed by one such unit - that attached to the 5th Marine Division at Iwo Jima - is impressive. Stool cultures and sneers were done on all cases of diarrhea admitted to the Division hospital. Water was examined frequently both for bacteriological and chemical contamination. Prisoners of war were examined for intestinal parasites and their serum was collected for agglutination for scrub and epidemic typhus. The assistant epidemiologist was detailed as acting Division Sanitation Officer. The 50 man squad from the

70. 4th MarDiv, pp. 272-273.

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31st Naval Construction Battalion served as the only functioning sanitation detachment. This squad, under the Sanitation Officer, constructed and installed 59 prefabricated heads, policed abandoned areas, filled shell holes and abandoned foxholes, buried 72 enemy dead after spraying them with penite, sprayed heads with 5 percent DDT, filled in or destroyed 14 enemy cisterns, and burned 16 enemy buildings. The acting Division Sanitation Officer made inspections of field kitchens and the Division bakery. Meanwhile the insect control group was hard at work. Fly control was the major problem and continued to be throughout the entire operation. Various areas of the beach were sprayed, but the work of the organization was not well regulated until the establishment of the Division Hospital on D plus 8. The entire hospital area and all tentage was sprayed with a 5 percent DDT mist before occupancy, and repeated at a bi-weekly interval. Flies never became a problem in this area. After the establishment of the Battalion Command Post, in the Division Hospital area, the unit functioned on call. Calls for the spraying of DDT in galleys, heads, command posts, and troop areas for the control of flies were received at the Battalion Command Post and relayed to the unit. With only one power sprayer at the disposal of the unit, this procedure proved the best method of operation. The location of the power sprayer was known at all times, and it could readily be dispatched to a new location without unnecessary loss of time. Three men were required for the operation of the power sprayer. The remaining three members of the unit were engaged in collecting entomological specimens. A

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collection of insects was made and the specimens mounted for further study at the rehabilitation area. Five percent DDT solution in kerosene was the chief chemical used in fly control. Sprayed with 250 pounds of air pressure, a fine droplet mist was laid down. The amount of active DDT in the solution was small but it was effective in spraying tentage and enclosed spaces against flies and other insects. The spraying of the operating rooms, wards, and other activities in the hospital area kept the fly population at a remarkably low level.

The Malaria and Epidemic Control Teams were handicapped by lack of basic transportation, since their work entailed constant traveling. The use of 1/4 ton 4x4 cargo trucks would have greatly expedited the transportation of personnel to inspect areas, to supervise the installation of sanitary facilities, to collect specimens of insects and pests, and to estimate droplet dispersion of airplane-sprayed DDT. Trucks were also needed to deliver DDT solution to units and to transport a power sprayer for the ground
71
spraying of DDT .

Assault rations - "C", "D", "10 in 1," and "K" - were used at Iwo Jima initially; later when screened galleys had been erected, type "B" rations were issued to certain units in rear areas. Initially water was carried ashore in expeditionary cans and water carts; later distilling apparatus was set up on the beach. All water was examined chemically and bacteriologically by the epidemiological

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units and found to be safe for consumption before being used.

Some units had obtained the knock-down plywood type of latrine box, but most units did not have these and they used types of their own manufacture or straddle trenches. It was the opinion of medical officers that the new pre-fabricated plywood latrine box was a distinct contribution to field sanitation.⁷³

Supplies and Equipment

The task of keeping doctors and hospital corpsmen both afloat and ashore, supplied and equipped with the hundreds of items required to carry out their work successfully, was well handled at Iwo Jima. Landing Force medical units carried 30 days' medical supplies, and provision was made for resupply shipments at regular intervals during the operation. The type and quantity of medical supplies were generally satisfactory in spite of the extremely heavy casualties. Most of the field hospitals had obtained sufficient materials for setting up the Wangensteen suction apparatus, but the large number of abdominal wounds soon put these to good use, and there was need for more. In one hospital there was an inadequate supply of non-traumatic abdominal sutures, due to the extensive abdominal surgery necessary, but this need was filled by borrowing from neighboring units.⁷⁴ Due to the heavy load of

72. V Phib Corps, pp. 431-432; 4th MarDiv, p. 250.

73. CTF 56, pp. 323-324.

74. CTF 56, pp. 323-324

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serious abdominal cases handled by the 38th Field Hospital, it ran short of Levine tubes temporarily. In great measure the shortage resulted from the failure to receive this item in automatic exchange for those evacuated with the casualties to ships. The shortage was alleviated by obtaining some tubes from the Corps Medical Battalion and a few from a hospital ship. Although occasional temporary shortages of litters and blankets occurred in some units, automatic exchange of these items functioned quite well. A considerable factor in the temporary shortage was the result of the evacuation of casualties with two or three blankets, as required by the cool weather encountered on Iwo Jima, and the receipt through automatic exchange of only one blanket. Another factor was that not all cargo planes evacuating casualties carried sufficient blankets for exchange as did the planes specifically designated as evacuation planes. ⁷⁵

The unit #3 medical kit was found to be unsatisfactory. Corpsmen in the front lines often placed essential items in their pockets rather than use the medical kit. Some used empty gas mask pouches and found them more suitable. ⁷⁶

The 8th Field Depot Medical Supply Section brought in 1200 units of serum albumin, all of which were issued within three days. Because of the ease of administration, small bulk, and the marked systemic response to it by casualties requiring additional blood

75. V Phib Corps, pp. 428-429.

76. V Phib Corps, pp. 427-428.

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volume, serum albumin was extensively used in the front line. It was felt by the medical officers that on future operations larger quantities of serum albumin should be landed with the assault troops. The supply of plasma carried, on the other hand, was probably excessive. The 8th Field Depot Medical Supply Section landed 100 bottles which were never drawn upon, and in addition, the section salvaged 900 bottles scattered about the beaches. This situation obtained as a result of the widespread, perhaps even excessive, use of the whole blood which was available in large quantities for this operation. There was considerable demand for sterile distilled water in 50 cc. ampules for intravenous use. The majority of this was for use in the administration of pentothal sodium or penicillin, and it was felt that more of this item should be carried on future operations.⁷⁷ It was found that certain items of medical supplies could be palletized to advantage. Supplies so packed were more easily found on the beach, and were protected from the weather. They had to be packed in a standard uniform manner, however, to conserve as much space as possible and facilitate stowage. The divisions were ordered to palletize up to 50 percent of their medical supplies and the block shipments⁷⁸ were all palletized.

One of the new developments in the chain of supply which was introduced at Iwo Jima was the Mobile Blood Bank Facility. The

77. V Phib Corps, pp. 427-428.

78. CTF 56, p. 324.

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personnel of the unit consisted of one Hospital Corps officer and two pharmacist's mates second class. The main items of equipment were two 150 cubic foot reefer boxes, one York flake ice machine, three electric generators, one 2 1/2 ton truck and one 1/4 ton truck. On 20 January 1945, the complete unit was embarked on LST 929. The initial supply of whole blood was received aboard on 14 February at the Saipan staging area. The Advanced Blood Bank Facility at Guam supplied 1456 units, and ships departing from the area furnished an additional 406 units to the bank. A preliminary issue of one case (16 units) of whole blood was made to certain ships at the staging area in accordance with the medical plan. Beginning on D-day, the Facility furnished whole blood on request to all units ashore and to ships. On D plus 8, the blood bank was landed and established at a central location accessible to all units and in the immediate vicinity of B Company, 3rd Marine Division, to which it was temporarily attached for convenience of location and operation. While

79. As of 1600, 19 March (D plus 28), the following quantities of whole blood were handled by the blood bank on Iwo Jima:

Received.....	3,994 Units
Issued.....	3,569 Units
Used by LST 929.....	325 Units
Surveyed (Hemolyzed*).....	<u>18 Units</u>

Remaining in blood bank 82 Units

The average daily issue during the period 19 February to 13 March (D-day to D plus 22) was 134 units.

*This hemolysis was the result of failure of the unit receiving the blood to ice it properly.

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operating ashore, additional blood was obtained from the hospital ships present, and by air, from the Advanced Blood Bank Facility at Guam. At all times throughout the operation the supply of whole blood was ample, and it was undoubtedly a material factor in saving
80
many lives.

Medical equipment was also generally satisfactory as to type and amount. The Navy Field Medical Unit furnished adequate equipment to allow a high standard of Field Medical Service. Oxygen units were extremely valuable since many penetrating chest wounds were encountered. Improvised portable fracture tables were used to great advantage. The wounds encountered were massive in extent and were frequently accompanied by various fractures. The Zimmer portable fracture table, recently adopted, had not yet reached all field hospitals. Portable plywood operating rooms proved extremely valuable in this operation, as they had in previous ones. The units dug them in and each provided a clean, comfortable place to operate. On the beaches, water seeped into some of the medical installations at high tide and the slightly elevated deck in these huts was appreciated during this period. Dust, as usual, was bad, but these
81
rooms were relatively dust-free. Some heavy items such as electric refrigerators never reached the unit for which they were intended. Of three large electric refrigerators scheduled for landing on an eastern beach for use by the 8th Field Depot Medical Supply

80. V Phib Corps, pp. 429-431, 442-444.

81. CTF 56, p. 323.

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Section in refrigerating plasma, penicillin, and biologicals, only one was ever received. Rough handling resulted in the damaging of some sections of the portable plywood operating rooms belonging to the corps medical units. As a result, sections from two plywood 82 operating rooms sometimes had to be pooled in order to set up one. The carbine which was issued to Medical Department personnel for defense purposes was not satisfactory. It was impossible to treat a patient and handle a carbine at the same time. The medical personnel were of the opinion that 45 calibre pistols would be better 83 suited for this purpose.

Vehicles for the transportation of medical personnel, supplies, and equipment were generally satisfactory as to type and 84 number. Because the land mass at Iwo Jima was so small, the need for motor transportation was not as great as in the Marianas operation. In the early stages of the Iwo Jima assault, a serious transportation problem resulted from the inability of wheeled vehicles to get over the beach until after steel mats had been laid and roads built. All supplies and equipment had to be carried by hand. Some of the motor transport which was stalled on the beach in the early waves was destroyed by enemy fire before it could be moved. However, after roads

82. V Phib Corps, pp. 428-429.

83. 5th MarDiv, p. 259.

84. The number and type of motor vehicles and rolling stock per medical company are given in Appendix P.

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were built, movement became normal.

The jeep ambulances again proved themselves the most valuable single piece of motor transport in the medical organization and were used to haul thousands of the casualties that occurred. 85

The Army's 3/4-ton ambulance used by the 38th Field Hospital demonstrated its desirability over the Navy's 1/2-ton ambulance for casualty evacuation. The Army ambulance could go anywhere that the Navy ambulance could go, and transported the casualties in much greater 86

comfort. There were a few Weasels available which were most valuable in the early stages of the operation. They were among the few vehicles that were able to get off the road and not get stuck in the soft volcanic sand. Many DUKW's were also used in the evacuation of casualties but enough were not available in the early stages of the operation. They were roomy, and lent themselves most satisfactorily to casualty evacuation. They went through heavy surf without difficulty and were more manageable alongside a ship than the amphibian tractors. For days at a time no small boats were able to navigate the surf and nearly all casualties had to be removed by means of amphibian vehicles which were for the most part DUKW's. In almost every operation undertaken in the Pacific Area, the DUKW has "saved 87 the day" for casualty evacuation.

85. CTF 56, pp. 326-327.

86. V Phib Corps, pp. 428-429.

87. CTF 56, pp. 326-327.

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Medical Records

Deficiencies in the handling of medical records in earlier operations had led to a reorganization of this work prior to the Iwo Jima landings. A program of indoctrination for personnel handling records under combat conditions was inaugurated. The importance of making legible entries on emergency medical tags and in Aid Station logs and reports was stressed.

A review of the medical records work of the 4th Marine Division will serve to illustrate how this type of work was handled. Early on D-day, trained shore party personnel were landed; but reliable records could not be maintained until late on D plus 1, due to the tremendous losses of personnel and equipment. During the first few days, the battle was so intense that it was difficult or impossible to keep reliable records at Regimental and Battalion Aid or at evacuation stations. This initial deficiency of reports was compensated for by reports received from 4th Division medical personnel assigned to the LST(H)'s off shore which cared for 4th Division casualties. After the initial period, reports were submitted regularly from all units. These reports showed marked improvement over former operations in legibility and accuracy of entries. The Medical Record Section landed on D plus 5 and was attached to Division Headquarters for the duration of the operation. This arrangement made it possible for the Medical Records Section to function in proximity to the Division Administrative Casualty Section. In this way information on file in each section was

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readily available to the other. On D plus 5, the Record Section commenced checking reports, and by the end of the day the first report of evacuation of casualties was ready for mimeographing. A total of 13 Evacuation Reports and 14 Division Hospital Reports of Admissions and Dispositions, listing 7,081 evacuated casualties, had been mimeographed and distributed by D plus 25 (16 March 1945). Distribution was made to all division and non-division units concerned. Copies were also forwarded to the Casualty Section, and to the Surgeon's Office, Headquarters, Fleet Marine Force, Pacific,
88
and to the Division Rear Echelon.

Dental Services

At Iwo Jima, as on all combat operations, important members of the Navy Medical Department's team were the dental officers and technicians attached to the medical companies. Regular hours for treatment were provided by the various ships' dental officers, and general dental service was satisfactory throughout the campaign. Dental officers, from D-day until they were called ashore, also assisted in the sick bays and surgeries by administering intravenous therapy and anesthetics. On arrival ashore, only emergency operations were rendered, but there were dental cases which developed even in the heat of battle. Dental officers made daily examinations in the hospital wards, and treatment was provided for all cases capable of receiving it. Serious jaw wounds requiring the services of a dental officer were treated in the field operating room. Dental

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officers also assisted in the receiving and shock tents and in the
89
identification of the dead.

Navy Field Medical Photographic Unit

An interesting innovation of the Iwo Jima campaign was the presence on the battlefield of Navy Field Medical Photographic Unit #3 from the Bureau of Medicine and Surgery. The unit, which was charged with the task of making a photographic record of Medical Department activities during the Iwo Jima operation, was composed of one medical officer, two pharmacist's mates, one photographer's mate, and one corporal, USMC. While following a pre-arranged script in their picture taking, the photographers did much "shooting" at large, catching many "opportunity shots." Their outlined assignments included movies and stills showing care of American and enemy dead, handling of food, all sanitary procedures and disposal of waste, water supplies, and fly and insect control. The films were to be used principally for training, documentary and general medical intelligence purposes. All organizations cooperated with the photographic unit and assisted it in getting a pictorial record of
90
medical activities which was believed to be of great value.

89. 5th MarDiv, pp. 251-252; CTF 56, p. 327.

90. V Phib Corps, pp. 433-434; Bullied Gazette, III, No. 17, 21 Apr. 1945.

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Summary and Conclusion

The Iwo Jima operation, fought on a small barren volcanic island, converted by the enemy into a network of mutually supporting underground fortifications, presented nothing of the usual battlefield pattern for the military surgeon to utilize in setting up his medical installations. There were no buildings, roads, wooded areas, fields or streams, but above all there was no room. Airfields, gun positions, pillboxes, supply dumps, and troops covered the place. But medical organizations landed and by dispersing their units into such areas as were allotted, with the help of the ubiquitous bulldozer, they literally dug themselves a place on the island. Portable plywood operating rooms were set up in holes in the ground and covered with tarpaulins to keep out the dust and cold. The engineers built roofs over captured empty sunken water reservoirs, which made good operating rooms. Ward tents were set up in airplane revetments or simply in long trenches bulldozed in the ground. The electric lights went in; the field surgical units were set up; the blood bank moved ashore; and by the time the transports left, a system of excellent surgical facilities was in operation.

The initial medical service for the landing force was that of the division medical units, while the first echelon of support afloat was furnished by a line of four LST(H)'s, staffed

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and equipped to act as close-in emergency hospital ships, just seaward of the line of departure. Excellent division field hospitals were established and operated by the 4th and 5th Marine Divisions. The 3rd Marine Division landed only two medical companies, and due to the consequent lack of sufficient facilities, was not able to operate a division field hospital. However, the direct support furnished by corps hospitals obviated the necessity for establishing a field hospital for that division. Corps medical units - the V Amphibious Corps Medical Battalion, Corps Evacuation Hospital #1, and the 38th Field Hospital (US Army) - were in direct support of the three divisions. They completed urgent surgery for all cases prior to evacuation, as well as supplied ambulance service for evacuation between the divisions and the beaches. In addition, they mutually supported each other. Very effective results were obtained by pooling the specialty services of neuro-surgery, ophthalmological surgery, and neuro-psychiatry at Company 4, V Amphibious Corps Medical Battalion in support of all troops.

The DUKW again proved of value as a vehicle for comfortable and safe transportation of casualties from shore to ship. At times, its value was especially great in obviating retransfer of serious cases at the beach for final evacuation to ships, and at other times, it was the only small craft that could safely negotiate the seaward trip through the heavy surf. The Weasel was, at times, used for evacuation in the forward as well as the beach areas. It was very useful in lateral evacuation in the heavy, loose, sand of the beaches and in the rough terrain of the forward areas where

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wheeled vehicles could not travel; but it could not be compared to the DUKW in value as an evacuation vehicle.

As of 1800, 24 March (D plus 33), total casualties were 24,244, of which 20,950 were battle casualties. As of that same time, burials ashore of American dead totaled 4,893. Casualties among medical personnel were very heavy. In one division alone, casualties of hospital corpsmen exceeded 50 percent in each of six battalions; in four of them casualties exceeded 60 percent, and in one they were in excess of 68 percent. Combined battle casualties for all division medical personnel exceeded 25 percent. During the first 21 days of the assault, combined casualties exceeded 1,000 per day. The non-effectives of the landing force became stabilized at approximately 4 percent. As of 1800, 24 March (D plus 33), a total of 17,677 casualties had been evacuated at Iwo Jima. A total of 2,358 casualties were evacuated from Iwo Jima by air without a single fatality. This service was of great value to the evacuation effort, and at times, when ship facilities were not available, it was the only means of relieving the pressure of the heavy load of casualties from the hospitals ashore.

Medical supplies and equipment were generally very adequate as to type and amount. Temporary, though non-critical, shortages of sterile distilled water in ampules, and of Levine tubes occurred. Automatic exchange of blankets was interrupted at times, but was

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never critical. Serum albumin appeared to have definite value in the field, but the results of further trial were needed before it could be accepted as any more than an adjunct to the use of plasma. Much credit was due the life-saving contribution made by the Mobile Blood Bank Facility, which supplied 3,976 units of whole blood for the attack forces. Between D Day and D plus 22, a daily average of 134 units was issued.

As opposed to the high incidence of tetanus in enemy wounded during the Saipan-Tinian Operations, no cases of tetanus were manifest in enemy wounded on Iwo Jima. Likewise, the high incidence of gas gangrene among troops of opposing forces at Saipan-Tinian did not obtain at Iwo Jima. The intensely cultivated soil of Saipan-Tinian would naturally be richer in pathogenic anaerobes than the barren wastes of Iwo Jima, but it appeared quite probable that the inoculations against tetanus and gas gangrene were the deciding factors.

Sanitation was, generally, very satisfactory. DDT sprayed from the air was extremely effective in controlling flies and fly breeding. The smaller number of mosquitoes present on the island presented no problem, and no serious types of insect-borne diseases were present. Sodium arsenite spraying of the dead aided materially in fly control, and burial of American and enemy dead was carried out as expeditiously as the military situation would permit.

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An unusually heavy load of casualties was expeditiously and efficiently evacuated, and a high standard of military medical care was maintained along the entire chain of evacuation. The medical service for the Iwo Jima Operation was better than for any previous operation in the Central Pacific area. It was felt that the casualties received the maximum medical care possible commensurate with the military situation.

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93. V Phib Corps, pp. 434-436.

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This study of the activities of the Navy Medical Department at Iwo Jima has been prepared in greater detail than those dealing with most of the other campaigns. It is intended to show how the Navy Medical Department profited from its experience in earlier operations and how improved organization, new equipment, and new techniques were devised to meet the needs of amphibious warfare.

The materials available on the Iwo Jima campaign were voluminous and the author made use of as many of them as time would permit. It should be clearly understood, however, that this study is not based on an exhaustive review of all available materials. The chief sources made use of are listed below.

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III. Film Materials

An extensive collection of excellent film material on the activities of the Navy Medical Department at Iwo Jima, taken by the Navy Field Medical Photographic Unit #1, along with materials obtained from other sources, is available in the Audio-Visual Section, Bureau of Medicine and Surgery. These materials were used in addition to the written records in the preparation of this study.

IV. Photographs

Another valuable source of information on the activities of the Navy Medical Department at Iwo Jima is the many excellent "stills" which are available. A large number of the better ones are used throughout this study to illustrate the various medical phases of this operation.

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G L O S S A R Y

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GLOSSARY

AGC	Amphibious Force Flagship
AH	Hospital Ship
AK	Cargo Ship
AKA	Cargo, Attack
AKN	Net Cargo Ship
Amtracks	Amphibious tractor
AP	Transport
APA	Transport, Attack
APH	Transport Fitted for Evacuation of Wounded
BARman	Browning Automatic Rifleman
CM	Mine Layer
CO	Commanding Officer
ComDesRon	Commander Destroyer Squadron
ComPhibsPac	Commander Amphibious Forces, Pacific
CTF	Commander Task Force
CTG	Commander Task Unit
CV	Aircraft Carrier
CVE	Aircraft Carrier, Escort
DD	Destroyer
D-day	Day scheduled for the landing of forces
DDT	Diphenyl - Dichloro - Trichlorethane
DM	Light Mine Layer
DMS	Mine Sweeper, high speed
DUKW	Large Amphibious Vehicles

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H-hour

HOW

H & S

KIA

LCI

LCM

LCVP

LSM

LST

LST(H)

LSV

LVT

MarDiv

MC

MIA

PhM

V Phib Corps

RCT

SMO

T/O

TransDiv

TransRons

UDT

Weasels

WIA

Time scheduled for the landing of forces

Another way of referring to H-hour

Headquarters and Service

Killed in Action

Landing Craft, Infantry

Landing Craft, Medium

Landing Craft, Vehicle and Personnel

Landing Ship, Medium

Landing Ship, Tank

Landing Ship, Tank (Casualty Evacuation)

Landing Ship, Vehicle

Landing Vehicle, Tracked

Marine Division

Medical Corps

Missing in Action

Pharmacist's Mate

Fifth Amphibious Corps

Regimental Combat Team

Senior Medical Officer

Table of Organization

Transport Division

Transport Squadrons

Underwater Demolition Team

Small Amphibious Vehicles

Wounded in Action

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CHAPTER XII

OKINAWA

Planning Organization and Training

The offensive against the inner defenses of the Japanese Empire which had been inaugurated with the attack on Iwo Jima in February 1945 was carried one step further in April with the launching of a mighty amphibious attack on Okinawa. Among the members of the Navy Medical Department aboard the vessels that carried the American forces to Okinawa were many veterans of earlier campaigns. They had learned much in the hard school of war. In this culminating campaign of the war against Japan they were given ample opportunity to apply their techniques and skills. A cornered foe fought back desperately with utter disregard for human life. American medical men at Okinawa, fighting equally hard to preserve human life, won a great victory in the field hospitals and aboard the LST(H)'s, the transports, the hospital ships, and the men-of-war.

As in previous campaigns, careful medical planning preceded the Okinawa operation. A detailed plan provided for: (1) care of the sick and wounded (including medical care for the civilian population controlled by the military government), (2) evacuation of the sick and wounded, (3) sanitation, and (4) medical logistics. Numerous conferences were held by the surgeons of the Fleet Marine Force, Pacific (1st and 6th Marine Divisions); the Amphibious Forces, Pacific; the III Amphibious Corps; and the Tenth Army, USA; and plans were worked out for

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accomplishing their medical mission.¹ The magnitude of the medical problem becomes apparent when it is realized that in the Okinawa operation expeditionary troops numbered nearly 500,000 men, while naval personnel aboard the more than 1,600 ships exceeded 350,000.²

Plans for the hospitalization of sick and injured naval personnel provided for the establishment of field hospitals by both the 1st and 6th Marine Divisions. In addition, two evacuation hospitals were attached to the III Amphibious Corps to provide specialists' care for the wounded and to assist in the evacuation of casualties.³ Eight LST(H)'s were provided and equipped as beach evacuation control vessels for this operation. Four were assigned to ships in the Northern Attack Force, mounting the III Amphibious Corps, and four to the Southern Attack Force, mounting the XXIV Army Corps. Evacuation from the beaches at Kerama Retto by the Western Islands Attack group was planned by LCVP's direct to ships, since no intervening reef was contemplated. Arrangements were made to have 6 hospital ships, 2 APH's and 2 APA's converted for casualty evacuation for use at Okinawa. Two ships were to be kept at the objective at all times to receive the most critical cases. Plans were drawn up for transporting casualties to rear area hospitals in the Marianas, Hawaii, and the United States as rapidly as circumstances would permit.

1. Action Report, Com Fifth Fleet, p. 43; Action Report, III Phib Corps, p. 24.

2. Action Report, CTF 51 (ComPhibForPac), p. 15; Action Report, Fifth Fleet, p. 43.

3. Action Report, III Phib Corps, p. 127.

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Whole blood was to be provided on the basis of one box per transport. Although this quota was not filled in all cases, the supply was adequate prior to departure for the target area.⁴

Medical planning by lower echelons was carried out in accordance with directives from higher authority and was based upon experience gained in previous operations. In the case of the First Marine Division, a medical officer of wide experience in clinical medicine was assigned to temporary duty as the representative of the Division Surgeon to investigate health conditions found during the operations at Leyte, Guam, and Saipan. Since many of the diseases expected on Okinawa had already been encountered in the Marianas and Philippines, a study of the medical department's experiences in those places proved of great value in making proper recommendations to the staff for dealing with these diseases.⁵

All units of the 1st Marine Division were instructed in the value of sanitation and the need for sanitary measures even during combat. Sanitary squads were trained to operate with each combat team, and they were instructed to spray all bodies with DDT and to assist in mosquito and fly control. Their work was to be supplemented by that of a Malaria and Epidemic Control Unit. Plans were made for installing sanitary latrines by burying 50 gallon drums to

4. Action Report, CTF 51, p. 476.

5. Action Report, 1st MarDiv, p. 173.

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about 3/4 of their height, and fitting them with prefabricated seats in such a manner as to shut out the flies. It was hoped that these measures would keep gastro-intestinal diseases at a minimum.⁶

Insofar as possible, the necessary equipment and supplies to bring all units of the First Marine Division up to standard strength were obtained from the medical supply facilities at Guadalcanal and Espiritu Santo. In numerous cases, however, shortages made it necessary to request supplies from Pearl Harbor. The difficulty seemed to be in the lack of coordination between the various supply facilities. First -aid jungle kits, which had been found to be far superior to the standard first-aid packet at Cape Gloucester and Peleliu, were available for most of the combat troops; but there were not enough supplies - vials for salt and atabrine tablets, and bottles for fungicide solution - with which to equip them. It was only with great difficulty that sufficient supplies were finally obtained to equip approximately 7,000 jungle kits. Efforts to obtain adequate supplies of medicinal brandy, which had been found to be very valuable in the treatment of combat fatigue, shock, and exposure cases, were unsuccessful because of disapproval of requisitions by higher medical echelons. Plans were made for the extensive use of serum-albumin in accordance with numerous directives from the Bureau of Medicine and Surgery. All supplies and equipment not carried by combat units were dispersed to the Division's five medical companies for transportation.⁷

6. Action Report, 1st MarDiv, p. 22.

7. Action Report, 1st MarDiv, pp. 22-23.

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Medical personnel of the Division were brought up to authorized strength. Each infantry battalion was assigned 40 hospital corpsmen, permitting the use of two corpsmen to each platoon. In addition, certain specified members of each combat team were assigned as litter bearers. These litter bearers, who were dispersed among the various rifle companies, were trained in first aid and the evacuation of casualties. It was to be their function to evacuate the casualties from the front lines to aid stations.

Plans similar to those of the First Marine Division were made by the medical departments of the other units which were to participate in the Okinawa operation. When the men went aboard the vessels that were to carry them to the target area, they were accompanied by sufficient medical personnel and facilities to give them care of a high order.

Meanwhile, medical units aboard the hundreds of ships of the Fifth Fleet were also laying their plans for participation in the largest operation thus far undertaken by that fleet. Efforts were made to train not only corpsmen but also entire ships' crews in first aid and the handling of casualties, since every man might be called upon to perform these duties in case of suicidal air attacks. Battle dressing stations, first-aid stations, medical personnel and supplies were as widely dispersed throughout the individual ships as military requirements would permit. Ample medical supplies were taken aboard the ships to meet all anticipated needs. Concrete medical barges,

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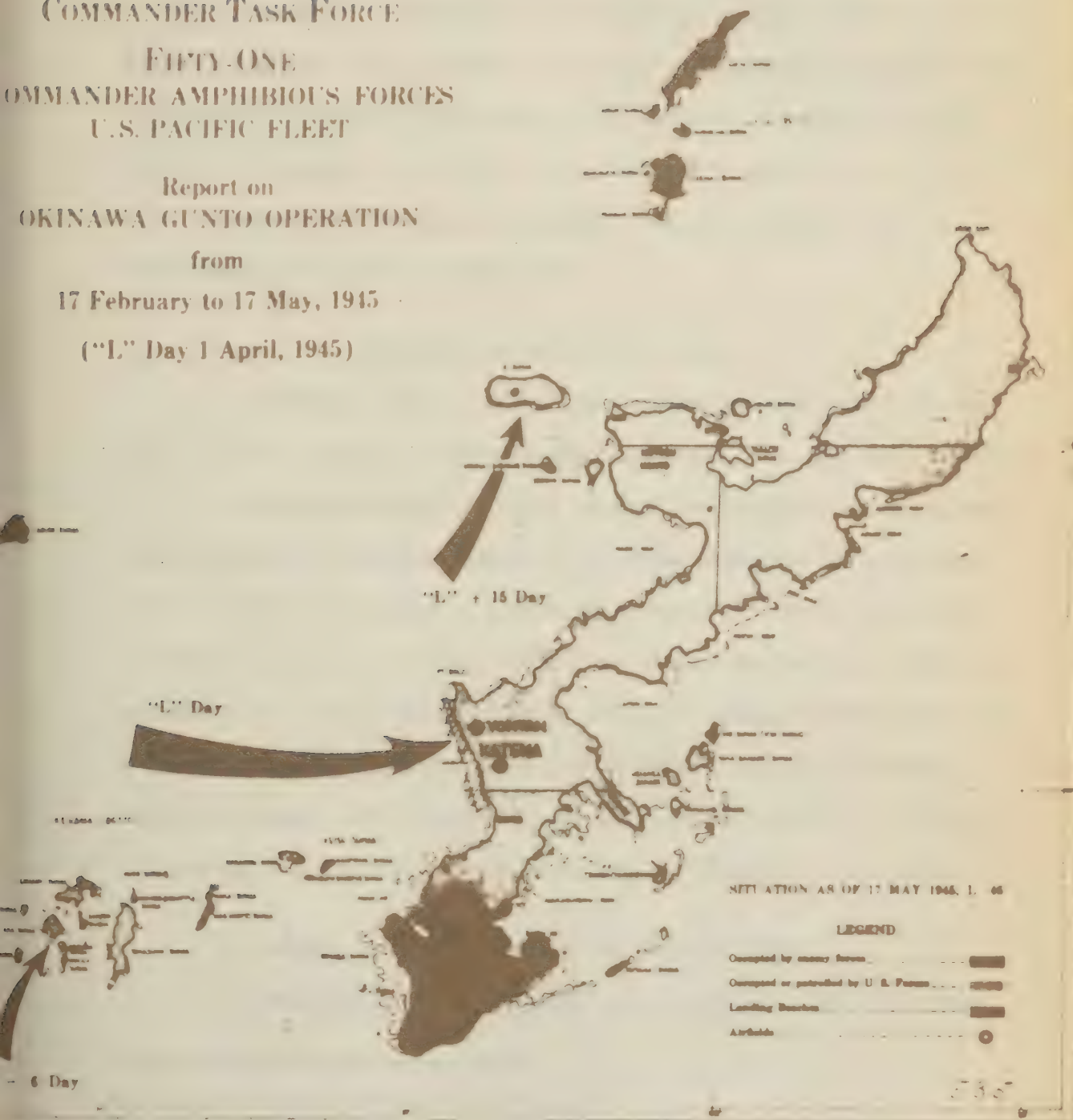
COMMANDER TASK FORCE
FIFTY-ONE
COMMANDER AMPHIBIOUS FORCES
U.S. PACIFIC FLEET

Report on
OKINAWA GUNTO OPERATION

from

17 February to 17 May, 1945

("L" Day 1 April, 1945)



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AK's and AKS's, were provided to replenish and replace supplies expended on combat ships of operating units returning for overhaul periods. Plans were made to provide the fleet with fresh whole blood in ample quantities throughout the operation.⁹ These careful preparations for combat were shortly to pay liberal dividends in lives saved, for during the Okinawa operation, as a result of "kamikaze" attacks by Japanese planes, the ships of the fleet were called upon to deal with the greatest casualty load among their own personnel that had been experienced in the entire war.

Embarkation and Aboard Ship

Loading of medical supplies, equipment, and personnel was done in such a way as to give maximum dispersal. In the case of the III Corps Medical Battalion, Corps Evacuation Hospital Number 2, and Corps Evacuation Hospital Number 3, each was embarked in three sections on different ships as a precaution against loss by enemy air or surface action. Sanitary conditions aboard the various ships were satisfactory. Daily inspections by troop and ships' medical officers maintained sanitary standards of a high order. Sick call showed a negligible number of illnesses requiring hospitalization. Galleys¹⁰ and messing facilities were satisfactory and heads were adequate.

Landing and Establishment of Medical Units

Debarkation and establishment of medical units on Okinawa

9. Action Report, Fifth Fleet, p. 48.

10. Action Report, III Phib Corps, p. 124; Action Report, 1st MarDiv, p. 173.

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were greatly expedited by the negligible enemy opposition encountered during this phase of the operation. In the case of the 6th Medical Battalion (6th Marine Division), debarkation commenced at H minus 2 hours, and units began landing at H plus 2 hours. One hour later (H plus 3) installations had been set up for the emergency handling of casualties under field conditions. After landing, all organizations dug in, and preparations were made against possible air attack and sniper fire. During the first few days the food consisted of K rations and the water supply was limited. Some discomfort was experienced by the men because of the rapid change from a tropical to a temperate zone, and the blankets that had been provided proved to be insufficient. All medical equipment was ashore and the 6th Marine Division hospital was established and functioning by L plus 2 days. So little opposition was encountered during the advance inland that its outstanding characteristic medically was the numerous displacements, made necessary by the rapid advance of the assault troops. One medical company displaced forward five times during the first week. Complete medical coverage was in operation for 6th Marine Division personnel from the time of their landing. At no time was there a break in the continuity of the evacuation chain. Especially trained surgical teams, using modern equipment in blacked-out operating rooms, operated day and night when necessary. Of special interest was a mobile surgical trailer which had been constructed by medical officers in the training area. This mobile unit proved of great value many times during the Okinawa operation.

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11. Action Report, 6th MarDiv, p. 59.

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The experiences of the medical units attached to the 1st Marine Division were similar to those of the 6th. Medical personnel attached to the line battalions and regiments landed with their units at various times on Love Day. The 1st Medical Battalion started landing on L plus 1 day, and by L plus 6 days all medical battalion personnel and equipment were ashore without loss. Erection of the Division field hospital was begun on L plus 5 and patients were being
12
received two days later.

The experiences of the III Corps Medical Battalion, Corps Evacuation Hospital Number 2, and Corps Evacuation Hospital Number 3 during the debarkation and landing phase of the operation were less fortunate. As has already been pointed out, both the personnel and equipment of each of these units had been embarked in three sections on different ships as a precaution against enemy air or surface action. In following this loading plan it had been impossible to embark the desired number of personnel on the same ships as their equipment. On several ships, only a small number of medical personnel were allowed to accompany their basic supplies. In consequence, there were insufficient men to guard medical property effectively when it was discharged on many beaches, in many boats and from many ships. Previous experience had taught the medical department that unloading on various beaches unless supervised with extreme care would result in extensive loss of gear. Notwithstanding urgent pleas by the units involved and by the corps surgeon, the gear was dispersed over

12. Action Report, 1st MarDiv, p. 173.

numerous landing beaches and the anticipated loss of gear resulted, despite strenuous efforts by the available medical personnel to guard it. The resulting confusion necessitated the expenditure of much effort on the part of medical personnel to locate and collect their equipment and supplies. It also entailed the loss of valuable time in setting up hospital facilities, nullified the purpose of combat loading, and retarded the employment of medical personnel for the care and evacuation of wounded, for which they were needed.

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While units of the 1st and 6th Marine Divisions and the III Amphibious Corps were making landings on the west coast of Okinawa, units of the 2nd Marine Division were engaged in making feint landings on the island's southeast coast. On L-day and L plus 1 day a skeletal group of men were debarked on various landing craft, and runs were made on the southeast coast of Okinawa to draw the enemy forces from the other side of the island where the true landings were in progress.

Medical personnel were aboard many of the landing craft which participated in the dummy run on the beaches. On L-day, LST 884, containing landing craft and other equipment, was seriously damaged; and after the transfer of the survivors with some of the equipment to other ships, the LST was abandoned. At attack transport (APA120) was also damaged by enemy action and a few minor casualties resulted.

14

13. Action Report, III Phib Corps, p. 124.

14. Action Report, 2nd MarDiv, p. 304.

The Battle Afloat.

During the initial landing and assault phase of the Okinawa operation, while combat units were experiencing only light opposition, the ships of the Fifth Fleet and supporting units were being subjected to heavy and persistent Japanese suicidal air attacks. These were almost the rule rather than the exception in the forward areas. In the screening areas of the outer orbit the ships were hit again and again until they were sunk or the enemy was driven off. There was no way of planning medically for such an abnormal and barbarous type of warfare. The careful plans which the medical staffs aboard ship had made prior to this operation, while valuable, were not designed to cope with such catastrophic incidents as the "kamikaze" attacks.

The medical officer aboard the destroyer USS MORRISON discussing his experiences following such an attack pointed out that the medical department aboard his ship was unable to function as a well-trained, carefully drilled unit -- each individual was reduced to rendering primitive first aid when and where he could, while praying that no additional planes would crash the ship. All hands were obliged to serve in the capacity of corpsmen. The USS MORRISON, which served as a radar picket station, was a popular target for the "kamikaze" pilots. Any attempt to locate the main dressing station in a safe area was futile since such an area did not exist. Medical personnel and materiel were decentralized insofar as possible. One attack after another was fought off, but finally within a space of ten minutes, four suiciders found their mark and the ship sank rapidly. The chaos

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and annihilation were indescribable. The wounded were given such casual appraisal and first aid as was possible between hits -- the arresting of hemorrhage being the main objective. Only one man was taken to a dressing station and he was trapped there. During the two hours which the survivors spent in the water, little more than encouragement could be administered by the medical staff. The heavy layer of fuel oil covering the survivors masked the majority of the injuries, but in retrospect, seemed to serve as a palliative application to the burns. The doctor and the uninjured corpsman (one corpsman was killed, another suffered a compound fracture) swam from group to group evaluating the condition of the men and giving basic aid where possible. Even after rescue by an LCS, only brief consideration could be given to the MORRISON'S 90 wounded, since the rescue craft was called upon to take aboard an additional 25 casualties from an LSM(R) which had also been sunk by "kamikaze" planes.

On this little support craft complete disorder prevailed. Treatment was of the crudest variety -- morphine was given and wounds were dusted with sulfa powder and hastily bandaged. Because of the urgency of the situation, no debridement or oil removal could be carried out. Plasma was at a premium -- the seven or eight units aboard quickly disappeared. A small amount of dextrose in saline was on hand and this was used as a substitute. The supply of bandages was rapidly exhausted and gauze rolls used instead. Immobilization of fractures was done mainly by "sand bagging" with any heavy object available. The only item of which there was a sufficient supply was morphine. This lack of supplies was nobody's fault -- the LCS had

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adequate medical equipment for her own needs, but could not anticipate such an emergency as this.

Four and one-half hours after rescue (six and one-half after the sinking) the more seriously wounded were transferred to the USS MERCY. Unfortunately they had been grossly undertreated, and six men succumbed on the fifty mile trip in. The minor casualties were cared for aboard the receiving ship USS LAUDERDALE (APA179).

Of the types of wounds encountered, the most serious were the burns. These were of the flash variety (at least two of the planes carried bombs). The clothing that the men wore afforded little protection against these high-explosive flashes -- shirts, skivvy shirts and even dungarees were burned through. Several burns involved better than 90 percent of the body area. Another type of injury frequently encountered was the shrapnel wound -- the penetrating wound from flying pieces of metal. Those men wearing kapoks were afforded protection from these high velocity fragments; those with inflatable life belts had no such protection, and a number of the crew found their rubber belts ripped in one or more places. Only one case of atmospheric blast injury was seen among the survivors; this man died shortly after being brought aboard the LCS. Many of the men suffered from fuel oil burns of the eyes. None of these proved to be serious, however, and all readily cleared on palliative treatment.

15

The experiences of the medical staff of the USS MORRISON

15. Action Report, USS MORRISON (DD560), pp. 19-21.

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were repeated over and over again as the Japanese made a desperate attempt to force the retirement of the American fleet. Ship after ship was hit and many of them were sunk before suicidal Japanese air attacks spent themselves.

16

Care and Evacuation of Casualties

The care and evacuation of casualties at Okinawa was well handled. No serious delays occurred at any time, either during the northern or southern phase of the operation. The unpredictably light casualties at the outset of the campaign permitted an orderly development and execution of evacuation plans. During the early stages of the Okinawa operation, evacuation was complicated by the torrential rains, the bomb craters, and the blown-out bridges which made the road not almost impassable at times. Ordinary vehicles bogged down in many instances, and DUKW's and Weasles had to be commandeered to assist in the evacuation. As the roads were rapidly repaired and the bridges which had been destroyed were rebuilt by the engineers, the evacuation of casualties was greatly improved. Throughout the campaign, however, evacuation over the primitive Okinawa roads was difficult, slow, bumpy, and shock-producing. In some instances, moreover, casualties had to be carried as much as 30 miles to hospitals or evacuation beaches. In spite of such difficulties, a report from the 6th Marine Division declared that not once did the elapsed time in transporting a patient from the front to the Division field hospital exceed five hours, while

16. Action Report, USS LUCE(DD552), pp. 16-18; Action Report, USS ST. GEORGE (AV16), pp. 102-104; et passim.

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the average was about two hours.

In order to obviate the necessity of bumping patients for miles over bad roads, the 6th Marine Division, during its campaign in northern Okinawa, worked out a plan for evacuating casualties by water. An LST(H) was stationed daily at the nearby port of Nago and all patients who were in condition to be moved were evacuated by this ship every twenty-four hours. Casualties from the Division field hospital were loaded aboard DUKW's and carried directly to the LST(H) without transfer. The LST(H) then carried patients to the transport area for¹⁷ distribution to hospital ships or other hospital facilities. A similar system was employed by the 6th Marine Division during its campaign in southern Okinawa to evacuate casualties from Naha.

During the operation in southern Okinawa, an ambulance unit was operated by the III Corps Medical Battalion to further facilitate the movement of casualties. The unit comprised ambulances belonging to the III Corps Medical Battalion, Corps Evacuation Hospital Number 2, and the Army. Patients were moved by ambulance from the division medical installations to those of the III Corps Medical Battalion, Corps Evacuation Hospital Number 2, and three Army field hospitals. Most of the vehicles used were Dodge ambulances which clearly demonstrated their superiority over the International ambulance and the jeep. The Dodge ambulance was the most comfortable and least likely to produce shock over the rough roads, and it was able to go almost

17. Action Report, 6th MarDiv, p. 60; Action Report, III Phib Corps, p. 125.

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anywhere a jeep could go. It carried four litters in contrast to the jeep's two, protected the patients from rain and dust, and was equipped with a heater and fan which insured additional comfort.

18

During the latter part of the operation in southern Okinawa, extremely heavy and persistent rains rendered roads almost impassable, and it was difficult to move patients even a few miles. Moreover, the wide reef in this area, along with rough weather, rendered the use of LST(H)'s perilous. In this exigency both the 1st and 6th Marine Divisions inaugurated air evacuation by cub planes from sections of concrete road near their collecting stations to landing strips adjacent to the division or corps hospitals. By means of air evacuation, serious casualties were transported from front line installations to hospitals where surgical specialists were available in a much shorter time and the degree of comfort was greater than could have been provided by any other means. In the case of the 1st Marine Division, 503 of its own casualties and approximately 200 from other units were evacuated by cub planes between 11 and 30 June 1945. Air evacuation undoubtedly saved many lives and did much to boost the morale of the American troops. Both medical and line officers who saw the system in operation felt that this method of air evacuation should be given serious consideration in planning future operations.

19

The LST(H)'s functioned well during the assault phase, both

18. Action Report, III Phib Corps, p. 125.

19. Action Report, III Phib Corps, p. 26; Action Report, 1st MarDiv, pp. 182-183.

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as evacuation control ships and as casualty transports from various distant beaches to the transport area. Through the distribution of casualties to the various AH's, APH's and APA's, they were able to prevent the overloading of any one ship's medical and surgical facilities. They also provided care for the seriously injured who were unfit for further movement to the rear. Both Army and Marine units provided valuable assistance to the regular medical personnel of these ships. During the landing operations, surgical teams from the III Corps Medical Battalion, Corps Evacuation Hospital Number 2, and Corps Evacuation Hospital Number 3 were ordered to LST(H)'s and APA's for temporary duty to augment the regular medical personnel until such time²⁰ as their respective units were ordered ashore.

Several hospital ships were present at the target on L-day and constantly thereafter throughout the campaign. In all, a total of seven hospital ships were utilized to transport wounded from the target to rear area hospitals. Because of the light casualties, it was possible to evacuate nearly all of them by hospital ships during the first 30 days.

Three incidents of attacks by enemy planes on hospital ships occurred during the operation. The USS RELIEF reported an attack by enemy aircraft on 2 April, but no damage was done; the USS SOLACE was attacked on 20 April with no damage; on 28 April the USS COMFORT - when 50 miles from the objective - was hit amidships by a suicide plane.

20. Action Report, CTF 51, p. 478; Action Report, III Phib Corps, p. 124; Fifth Fleet, p. 45.

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Twenty-nine men were killed, 33 were wounded, and 1 was missing as a result of this wanton attack. On the same day that the COMFORT was attacked, the USS PINKNEY (APH2) was also hit amidships by a suicide plane resulting in 22 killed, 11 wounded, and 19 missing. Care of the wounded was rendered difficult by the burning of the sick bay area and its facilities for casualty treatment and by the death of the senior medical officer the following day as a result of wounds. Notwithstanding these attacks, the hospital ships maintained orderly shuttle trips from the target to the hospitals based in the Marianas. ²¹

Daily air evacuation from Okinawa to Guam was put into operation by the Naval Air Transport Service and the Army Air Transport Command early in April. The majority of the seriously wounded were evacuated by hospital ships, but thousands of casualties whose condition permitted were flown out. In this way the local hospital facilities were prevented from becoming overcrowded.

The relatively few prisoners of war requiring medical care were given the same first-aid treatment as American casualties, after which they were evacuated to the III Amphibious Corps Medical Battalion for further care and disposition. ²²

A summary of evacuation statistics for the Okinawa operation (1 April through 27 May 1945) by all types of carriers showing the relative roles played by them is given below:

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21. Action Report, 5th Fleet, p. 45; Action Report, CTF 51, pp. 476-477. A hospital ship evacuation list is given in Appendix A.
 22. A list of daily air evacuations is given in Appendix B.

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Number of casualties evacuated by hospital ships	11,731
Number of casualties evacuated by surface vessels other than hospital ships - (APA, APH, BB)	1,405
Number of casualties evacuated by air (NATS, ATC)	<u>11,771</u>
Total - - - - -	24,907

A study of these figures reveals how large a part aircraft played in the evacuation of casualties from Okinawa, and how much larger a proportion of the wounded were provided with hospital ship evacuation than in previous campaigns. In conclusion, it may be said that American fighting men at Okinawa were given the best evacuation service and the finest medical care yet provided in an amphibious operation in the Pacific theater.

23

Medical care and evacuation for the civilian population was under the direction of the military government and steps were taken for handling them in a humane and efficient manner. Forward Marine Corps and III Amphibious Corps units gave emergency first-aid treatment to civilians and routed them to military government installations. Lifesaving instances were numerous among native children and adult females who had received self-inflicted or family-inflicted wounds, chiefly throat cuts, in an attempt at death rather than hazarding capture and torture by the Americans. The Japanese victims appeared dumbly astonished and grateful for the merciful attention administered by the American medical men. Malaria and Epidemiology

23. Action Report, Fifth Fleet, p. 46; Action Report, CTF 51, p. 477; Action Report, 1st MarDiv, p. 175.

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Control units made laboratory examinations of selected groups of civilians to determine the incidence of malaria and filariasis among them. Results in the case of malaria were negative, but for filariasis it was about 30 percent positive.²⁴

During the early stages of the Okinawa operation, as a result of repeated "kamikaze" attacks, naval casualties exceeded landing force casualties for the first time in World War II. It became apparent that floating hospital facilities were urgently needed at the objective during the night to care for the wounded personnel from ships bombed or struck by suicide planes. Hospital ships were under orders to retire each night during this period, so upon the arrival of two converted APA's, the USS CRESCENT CITY and the USS GOSPER, they were designated as casualty ships and were stationed offshore for night duty. One was stationed at Keramo Retto and the other off the Hagushi beaches. The problem of caring for survivors and injured having become too heavy for these ships, two APA's were anchored near each evacuation ship to handle the unwounded survivors. This permitted the CRESCENT CITY and the GOSPER to devote themselves to caring for the wounded. These special vessels were, in addition to the APH's, the RIXEY and the PINKNEY, a number of assigned APA's, and the evacuation control LST(H)'s. Four PCE(R)'s were available for casualty evacuation from screening ships and they proved well suited for rescue purposes.²⁵

24. Action Report, 1st MarDiv, p. 175; Action Report, Fifth Fleet, p.45.

25. Action Report, STF 51, p. 477; Action Report, Fifth Fleet, p. 45.

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At Kerama Retto the Naval Operating Base evacuated numerous casualties resulting from the "kamikaze" attacks upon adjacent picket stations and upon their base by utilizing a patrol boat. This boat was especially equipped with 75 berths and with medical personnel so that it could give immediate medical attendance to the wounded and remove the dead from stricken naval units. Adequate means for emergency medical care, treatment, and evacuation for the Fast Carrier Force (TF58) was provided by the hospital ship USS BOUNTIFUL which was stationed with the Logistic Support Force.²⁶

Examples of conspicuous heroism and devotion to duty by medical personnel at Okinawa, as in previous operations, were numerous. There was the case of Victor M. MacSorley, PhM 2/c, who was serving with a company of the 6th Marine Division on the Motobu Peninsula. A Japanese shell had nearly severed a Marine's foot and an amputation was required. In the dead of night, with a Japanese mortar barrage still in progress, MacSorley performed the amputation with his combat knife, occasional star shells providing the only light. The hospital corpsman attended a total of 18 wounded Marines that night. At dawn he returned to his aid station, carrying a sergeant, his last patient, across his shoulders.²⁷

Another hospital corpsman who distinguished himself was Robert H. Martin, PhM 3/c, who served with the Fifth Marine Regiment

26. Action Report, Fifth Fleet, p. 45.

27. Hospital Corps Quarterly, October 1945, p. 65.

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of the 1st Marine Division for 17 months. During a Japanese night attack outside Naha, Martin was in the front lines with Company B, dug in on the side of a coral ridge. The enemy was in caves on the opposite side. When the command came to attack, the Japanese ran from their caves, shouting and throwing grenades. A Marine was hit and called for aid. When Martin jumped from his foxhole to go to the aid of the wounded man three Japs came at him. He lashed out with his fists at the one closest to him and kicked at the second. He charged the third and knocked him to the ground. Escaping the Japs, the hospital corpsman reached the wounded Marine and treated him. The cry "corpsman" came from other foxholes. In spite of the fact that Marine and Japanese small arms fire was interlacing the area, Martin broke
28
cover time after time to go to the aid of the wounded.

Lt. Herbert E. Valentine, (MC), USNR, and his two hospital corpsmen, Leroy J. Jackson, PhM 2/c, and Marvin D. Wade, PhM 2/c, risked their lives to aid several Marines whose artillery gun and ammunition suffered a direct hit by a Japanese shell. The explosion occurred while Dr. Valentine and his assistants were several hundred yards away at a command post. He hurried to the scene while the Japanese barrage continued to fall in the area, and the air was full of flying missiles from the Marines' own exploding ammunition. The doctor found that four of the Marine gun crew had been killed outright, but he was
29
able to given medical treatment to three others.

28. Hospital Corps Quarterly, October 1945, p. 67 .

29. Hospital Corps Quarterly. October 1945, p. 68.

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Scores of incidents such as these could be cited to illustrate the bravery and devotion to duty exhibited by medical personnel. Throughout the Okinawa campaign many doctors and hundreds of corpsmen daily risked their lives to provide the fighting forces with medical care.

The Okinawa operation proved the need for a large pool of trained Hospital Corps replacements. In the case of the 1st Marine Division there were 478 casualties among Hospital Corps personnel during the campaign in southern Okinawa. Forty-nine of these were killed in action, 226 wounded in action, 17 injured, and 186 sick. Dispatches were sent asking that urgently needed replacements be sent by air. On 5 June, 10³ were received; a like number were received on 7 - 8 June. Finally on 16 - 17 June after the acute need was past, 67 replacements arrived. This method was unsatisfactory both quantitatively and qualitatively. Few of the lower rated men had been in any combat area and had little idea of the duties expected of them. It was the feeling of the medical staff on the spot that the best solution to the situation was to order a minimum of 100 extra hospital corpsmen to each Marine division at least two months prior to an operation. These men could then be trained under experienced personnel. After training with line regiments, the corpsmen could be transferred to the medical battalion where they would be available for immediate use as combat replacements. After combat they could be retained to relieve the personnel due for rotation.

30

30. Action Report, 1st MarDiv, pp. 176, 183.

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Shortages of medical personnel developed in the fleet also as a result of the heavy casualties from "kamikaze" attacks. During intense air raids medical personnel on screening and picket ships operating fifty miles from the objective proved inadequate to handle the situation. Nine junior officers were transferred to the screen commander for assignment to his ship to relieve the shortage. Casualties among the medical officers and corpsmen aboard combat vessels required frequent replacements from medical staffs aboard transports. Often damage to ships was of such a nature as to require their retirement, during which period replacements were effected.³¹

A summary of casualty statistics for the Okinawa operation through 27 May 1945 provides an interesting insight into the nature of this campaign. The grand total was 38,420. Of these, 28,447 were incurred by Marine and Army combat troops and 9,973 by Navy personnel afloat.³² The ratio of Marine killed to wounded was 1 to 5; Army, 1 to 4.25; and Navy, 1 to 1. The casualties occurring in the forces ashore were light during the initial landing and assault phase of the operation, but they mounted steadily as organized enemy resistance continued into the second and third months. The fleet, under constant

31. Action Report, Fifth Fleet, p. 48; Action Report, CTF 51, p. 477.

32. A more detailed picture of casualties is presented in Appendices C through G. Appendix C (Battle Casualties through 27 May, Disease and Non-Battle Casualties); Appendix D (III Amphibious Corps Casualties, 1st Marine Division, 6th Marine Division, Corps Troops); Appendix E (Naval Personnel Casualties by Ships); Appendix F (Chart showing Percentage of Battle Casualties, 1st Marine Division); Appendix G (Series of six charts presenting various aspects of 6th Marine Division Casualties).

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pressure from enemy air attacks, including almost daily episodes with "kamikaze" special groups, suffered severe casualties. Killed and missing exceeded the number of wounded for probably the first time in naval history.

Disease and non-battle casualties were never a serious factor at Okinawa. Among the forces ashore they approximated 6 percent of the complement. A statistical study of disease casualties evacuated from Okinawa, reported by the surgeon, 10th Army, for the month of April follows:

<u>DIAGNOSIS</u>	<u>NUMBER</u>	<u>PERCENT OF TOTAL</u>
Dermatosis	130	10.6
Diarrhea & Dysentery	80	6.5
Psychoneurosis	115	9.4
Combat Fatigue	305	24.8
Hepatitis	106	8.6
Insect-borne Disease	20	1.6
Meningitis	3	0.2
Others	<u>470</u>	<u>38.3</u>
	1,229	100.0%

The non-battle casualties in the fleet were of no moment³³ and occasioned only negligible demands on evacuation facilities.

Hospitalization

Hospitalization throughout the Okinawa campaign was entirely adequate. Light enemy resistance during the northern phase of the operation greatly simplified the problem of providing satisfactory hospital facilities in this area. The 6th Marine Division field

33. Action Report, Fifth Fleet, pp. 43-44; Action Report, 1st MarDiv p. 174; Action Report, 6th MarDiv, pp. 60, 61; Action Report, CTF 51, p. 478.

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hospital was established and in operation by L plus 2 days. The 1st Marine Division hospital was functioning by L plus 7. Supporting the Division field hospitals were the III Corps Evacuation Hospitals Numbers 2 and 3 which provided specialists' care for the wounded and assisted in the evacuation of casualties.³⁴

A brief review of the activities of the 1st Marine Division field hospital during the northern phase of the Okinawa campaign will indicate the general nature of the hospital problem in this area. The hospital was located on the main North-South highway so as to provide easy access for ambulances. Cover was partly natural and partly artificial, camouflage nets being used to great advantage. The wards, admission tent, laboratory, pharmacy, operating room, and X-ray were dug in to a depth of three or four feet and banked with sand bags. All essential departments were light-proofed so that work could continue in emergencies. Sufficient cots were set up to care for 200 cases with a reserve on hand to permit expansion of facilities to 400 in an emergency. Evacuation during the first week was from the beaches to LST(H)'s 949 and 950, which had been designated as casualty receiving ships for this sector. As soon as hospital facilities had been established, evacuations were through the Division field hospital and the III Corps Evacuation Hospital Number 3. A total of 460 combat casualties were treated, of which 324 were evacuated and 136 returned to duty. Three died of wounds while under treatment. Disease and injury cases

34. Action Report, III Phib Corps, p. 127; Action Report, 6th MarDiv, p. 59; Action Report, 1st MarDiv, p. 173.

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totalled 1,084 - of which 447 were evacuated, 607 returned to duty and 4 died. A total of 1,544 cases were treated during the northern phase
35
of the Okinawa campaign.

During the latter part of April, Marine Corps and III Amphibious Corps Units were called upon to support XXIV Army Corps troops in their bitter battle against the entrenched Japanese forces in southern Okinawa. During this phase of the campaign the fighting was bitter and casualties were heavy. In the case of the 1st Marine Division, as assault elements started moving to the southern sector on 30 April, they were accompanied by their medical companies which started receiving casualties immediately. An advanced division field hospital was set up behind a large ridge which provided ample protection from the occasional enemy artillery shells which were landing in the area. The medical companies were moved forward as the troops advanced and field hospitals were maintained as close behind the front lines as the military situation would permit. A psychiatrist who reported for duty with the Division on 15 May proved to be a valuable asset. The Army Medical Department's cooperation was excellent at all times, and additional ambulances, supplies, and laundry services were **gladly furnished when** requested.

During the last week in May, heavy rains made the roads almost impassable and movement of the hospital to Naha was delayed until 7 June 1945. The move was started at dawn and by 1600 of the same day

35. Action Report, 1st MarDiv, pp. 173-174.

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casualties were being received and treated. No attempt was made to utilize any of the buildings in the city as it was found that a better site could be secured by employing a bulldozer to push away the wrecked buildings and debris. The hospital was located on the main North-South highway near its junction with the East-West highway, thereby affording an excellent road net for the reception and evacuation of casualties. At first, evacuation was by ambulance and LVT to an LST(H) anchored off an estuary approximately one mile north of the city of Naha. After Naha harbor had been cleared, an evacuation point was established at a dock in Naha approximately 400 yards from the hospital.

Penicillin and whole blood were used extensively by the 1st Marine Division units, and it was found to be extremely valuable. Whole blood was used as far forward as the battalion aid stations as a regular procedure, and it proved to be a lifesaving factor in many cases. A total of 1,057 pints of whole blood were transfused during the entire operation. A total of 1,273 surgical operations were performed in the field hospitals, exclusive of the many emergency surgical procedures performed in the battalion aid stations and the collecting stations.

A valuable adjunct to the hospital surgical facilities of the 1st Marine Division in this operation was its mobile operating room which had been improvised from an amphibious tractor. On one occasion one of these mobile operating units was ambushed by a machine gun at very close range, but due to its armored protection no damage was done to personnel or equipment. The ease with which the mobile

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operating unit could be effectively blacked out proved a valuable feature. It allowed the surgeon to take the patient into a well lighted operating room at once instead of trying to work with a flashlight under a tarpaulin or tent fly in a small, crowded blackout tent. Ample room and lighting were available in the mobile units for any operating procedure. During heavy rains and in deep mud they afforded a dry protected operating room where the patient in shock was completely protected from the cold wind and rain. The surgeons had a clean, dry deck on which to stand, in contrast with the necessity for standing in mud and water up to their ankles. Another possible use of the mobile operating room as visualized by the medical staff (although not employed in the Okinawa operation) was to take surgical facilities to the patient, where evacuation of the patient to the surgical facilities was not possible because of the terrain, heavy fire, or the accumulation of a large number of seriously wounded in a small area. The utilization of the amphibian tractor as an operating room received the enthusiastic support of the line as well as of medical personnel. Moreover, the amphibian tractor was found to be useful for moving the collecting stations or aid stations. The equipment and personnel could be placed in the tractor which could then proceed to the new site across
36
any type of terrain.

The experiences of the other Marine Corps and III Amphibious Corps hospital units were similar to those of the 1st Marine Division. An interesting innovation in bringing surgical care closer to the

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battle front was employed by the III Corps Medical Battalion. With the aid of a Seabee medical section, the Battalion had converted a discarded radar trailer into a mobile operating room, and on Love plus 1 day, the unit was landed on Blue Beach Number 2 where it functioned as an adjunct to the shore party medical section. It later rejoined its parent organization, and rendered continuous service throughout the Okinawa operation.³⁷

A valuable supplement to the Navy Medical Department's hospitalization program was the operation of a rest camp in a near area during the final three weeks of the campaign.. This camp, which was operated as an annex to the III Corps Medical Battalion, provided a place to which men who were physically exhausted could be sent to recuperate. These men were thus removed from a hospital atmosphere, and, after a few days' rest, they were often able to return to their regiments.³⁸

Health and Sanitation

General health and sanitary conditions at Okinawa among the forces both afloat and ashore were excellent. Advance information had led the medical staff to exaggerate the menace of scrub typhus, malaria, schistostomiasis, and snake bite, and to underestimate the danger from filariasis. The medical department had landed prepared to experience some trouble from scrub typhus, but interrogation of

37. Action Report, III Phib Corps, p. 124.

38. Action Report, III Phib Corps, p. 127.

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several Japanese physicians who had lived on the island all of their lives elicited the information that this disease was unheard of. This information was taken with reservation, but in the approximately 40 days of the occupation of the central and northern parts of the island, no cases of scrub typhus were encountered. This situation was rather surprising inasmuch as the natives were infested with body and head lice. Preliminary medical intelligence had also emphasized the necessity for not bathing in the streams because of flukes. An extensive investigation of snails, flukes, and leeches on Okinawa failed to reveal any bearing cercaria. Malaria vectors were found and filariasis was present in the blood of between 20 and 35 percent of all natives - men, women, and children - who were examined. Under the circumstances³⁹ the mosquito control program was stepped up.

Medical intelligence preliminary to the invasion had stressed the presence of two varieties of poisonous snakes on Okinawa. However, the snake menace failed to materialize; only about a dozen cases of snake bite were reported, no fatalities occurred, and the systemic symptoms were never alarming. This situation was fortunate since the anti-venom had to be refrigerated and frequently could not be administered for some time after the bite occurred.

Okinawa presented many medical features of military importance and interest, since practically every disease known to Japan was to be

39. Action Report, 6th MarDiv, pp. 60-61; Action Report, Fifth Fleet, pp. 43-47; Action Report, III Phib Corps, p. 152.

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found there. Had United States forces been called upon to invade Japan, the medical knowledge gained at Okinawa in respect to malaria, dengue, filariasis, diarrhea, dysentery (amoebic and bacillary), the venereal diseases, leprosy, tuberculosis, encephalitis, meningitis, Weil's disease, hepatitis, and other diseases would have proved of great value.⁴⁰

During the first months of the Okinawa operation when Marine Corps and III Amphibious Corps units were occupied in the northern part of the island, casualties were light and health and sanitary conditions were readily kept up to standard. During the last two-thirds of the operation on the southern part of the island, however, the fanatical resistance of the well entrenched foe, torrential rains, blinding dust and torrid heat complicated all problems of sanitation. At the very outset of the operation effective sanitary measures were instituted. The beachheads were sprayed with DDT from carrier-based planes beginning on L plus 3; after L plus 10, land-based bombers continued the operation. Attached to the combat teams were sanitary squads consisting of one hospital corpsman and 19 Marine enlisted men. Their function was immediate non-specific insect control in the combat area during the assault phase. These teams, supplied with spraying equipment and DDT in oil, proved invaluable in their specific tasks. Following behind the combat teams, the sanitary squads sprayed all dead bodies and the adjacent ground with DDT in oil. Enemy dead as well as civilian dead and livestock were sprayed and buried by working squads

40. Action Report, III Phib Corps, p. 126; Action Report, Fifth Fleet, p. 47; Action Report, 6th MarDiv, pp. 60-61.

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where found. American dead were collected and transported to the division cemetery. There was great need for more personnel and transportation for the graves' registration section since more rapid removal of the dead was desirable for reasons both of sanitation and morale.⁴¹

The Malaria and Epidemic Control Units attached to the Marine divisions performed a valuable function in the investigation of epidemic disease conditions, mosquito and fly control, and preventive medicine in general. The 50 man detachment furnished the 1st Marine Division Malaria Control Unit by the 145th Construction Battalion enabled them to cover efficiently much greater areas than would have been possible otherwise. The 6th Marine Division Malaria Control Unit was handicapped by the repeated refusal of the commanding officer of the 58th Construction Battalion and the commander of construction troops to furnish the necessary men. It was not until 27 May 1945 that they finally complied with directives on the subject. In spite of such handicaps the 6th Marine Division Malaria and Epidemiological Unit functioned in an outstanding manner. The entire Division area was infested with fleas; malaria-bearing mosquitoes were present; stagnant water, open heads and decaying food all presented problems. The control program consisted of spraying the entire area and the dwellings with DDT both from the air and by means of hand sprayers. DDT powder in the possession of each officer and man was used freely on clothing and bedding. Rice paddies were drained; all mess halls were screened; open heads used by

41. Action Report, CTF 51, p. 478; Action Report, 1st MarDiv, pp. 174-175; Action Report, III Phib Corps, p. 125.

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the natives were covered, and atabrine discipline was carefully supervised. The valuable work of the Malaria Control Units and the Naval Research Unit in checking the validity of pre-invasion medical information permitted a concentration of effort on the prevention of those diseases which were a potential threat to the health of the invasion⁴² forces.

Until water points could be established and tested, all water used by combat units was obtained either from ships or from supplies that had been combat loaded at the staging area. The earliest water points established employed distillation to purify the water; later the method involved filtration and chlorination. As an additional precaution a weekly analysis of water supplies was made. These precautions were evidently effective for no outbreaks of water-borne diseases were encountered.

Food for the combat troops was supplied in the form of C and K rations, and it was found satisfactory both as to quantity and quality. A number of 10 in 1 rations were also used, and in the estimation of both men and medical officers they were superior to all other rations. No attempt was made to give the men hot food until screened galleys were available and equipment had been set up to provide boiling water for cleansing mess gear. No epidemics of gastro-intestinal diseases⁴³ occurred throughout the campaign.

42. Action Report, III Phil Corps, pp. 125-126; Action Report, 6th MarDiv, p. 59.

43. Action Report, 1st MarDiv, p. 174; Action Report, CTF 51, p. 478; Action Report, 6th MarDiv, p. 60.

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Supplies and Equipment

On the whole, the medical supplies and equipment for the ground forces at Okinawa were adequate and satisfactory. Resupply was well handled, and in the matter of block shipment, it was superior to that experienced on previous operations. Due to the low priority on medical supplies, receipt was sometimes slow. The selection of material and palatization of medical supplies showed much thought, and the efficiency with which they were handled assured ample supplies to all units. Whole blood and penicillin were available in sufficient quantities to meet all needs and their use was believed to have been an important factor in preventing infection and saving life.

During the campaign in northern Okinawa, where operations covered only short distances, the existing number of trucks and ambulances was sufficient to meet all needs. With the shift of operations to southern Okinawa, where long distances had to be covered, there was need for additional transportation. The six 2 1/2 ton M5 trucks provided each medical battalion were totally inadequate. Ambulance facilities were also insufficient. To cover completely the ambulance situation, it was felt that additional jeep and heavy ambulances were needed so that each medical battalion could be allocated one jeep ambulance, each regimental headquarters provided with three, and artillery regiments and battalions with a similar number. Medical companies could have performed their duties more effectively had each been provided with a minimum of six 3/4 ton Dodge ambulances, and the H & S companies with a minimum of ten. Experience on the Okinawa

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operation showed that such a number would not have been excessive.

Medical supplies for issue to the Fifth Fleet were generally satisfactory. Supplies were controlled in the rear area by Commander Service Squadron 10. Concrete medical barges, AK's, and AKS's were maintained to replenish and replace supplies expended on combat ships of operating units returning for overhaul periods. Medical supplies, consisting of medical blocks for various types of ships, were made available to the Fast Carrier Force through tankers and AK's operating with the Logistic Support Group (Commander Service Squadron 6) in the fueling area. AK's and AKS's containing medical supplies were stationed at Okinawa (under cognizance of the Joint Expeditionary Force) and they supplied vessels in that area.

Fresh whole blood, in ample quantities, was provided vessels of the fleet throughout the Okinawa operation. Blood given to the seriously wounded during the early shock stage proved truly lifesaving. The universal "O" type field unit of whole blood was proved to be the outstanding means for treatment of hemorrhage, serious gunshot cases, and major multiple wounds.⁴⁵ The landing of the shore-based blood bank was delayed for more than a week as a result of the bombing of the USS ACHERNAR (AKA53) which carried the equipment. The ship's unloading boom having been damaged, unloading of equipment was held up until repairs could be made. The flake ice machine was not in operation

44. Action Report, III Phib Corps, pp. 126-127; Action Report, 1st MarDiv, pp. 176-177, 183-184.

45. Action Report, Fifth Fleet, pp. 48,49.

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for a month because of lack of equipment to provide the necessary fresh water cooling system. IST(H) 929 assisted with storage of the whole blood and provided the shore-based blood bank with ice until satisfactory shore facilities could be established. The amount of whole blood distributed to ships and to base and fleet hospitals during the months of April and May was as follows:

April - - - - -	23,162
May - - - - -	<u>-13,522</u>
Total - - - - -	36,684 pints (Of this total 12,500 pints were shipped by air.) 47

On the screening ships the 5 percent complement of plasma issued them was inadequate as a result of the high percentage of burn cases among the heavy casualties resulting from "kamikaze" attacks. In an attempt to deal with the emergency, a plasma bank was established on the CRESCENT CITY (APA21) to which transports transferred a portion of their supplies of plasma, and screening vessels were instructed to take plasma on board up to 20 percent of complement. 48

Dentistry

Satisfactory dental facilities and adequate personnel were maintained throughout the Okinawa operation. Each medical company had an regularly assigned dental officer with a field unit to take care of all dental cases that might arise. Furthermore, each combat team was

46. Action Report, CTF 51, p. 477.

47. Action Report, Fifth Fleet, p. 49.

48. Action Report, CTF 51, p. 477.

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supplied with one dental officer to take care of emergency dental treatment. Dental officers assigned to the forward echelon had been given extensive training in anesthetic technique at a fleet hospital during January 1945. As a result they were able to give invaluable assistance to the medical officers in this work, thereby enabling the latter to care for many more patients than would otherwise have been possible. 49

Summary and Conclusion

The Okinawa campaign marked the culmination of the fighting against Japan. The loss of this key island only 350 miles from Kyushu, southernmost of the main Japanese islands, was an important factor in convincing the Japanese militarists and government that further fighting was hopeless.

The Okinawa campaign also marked the culmination of the U. S. Navy Medical Department's work. Medical lessons learned in earlier campaigns were applied with gratifying results in this final amphibious assault. Medical personnel and facilities, supplies and equipment were generally adequate. Many of the doctors and corpsmen, being veterans of earlier campaigns, were able to give direction to inexperienced personnel.

From the time of debarkation of the assault forces until the conclusion of the campaign, medical installations were never far removed from the front lines. A complete chain of medical care and evacuation functioned throughout the campaign. Company aid men advancing

49. Action Report, 1st MarDiv, p. 175.

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side by side with the assault troops gave first aid, often under enemy fire. Litter bearers then carried the wounded back to the nearest aid stations. Those requiring immediate medical care were treated, after which they were carried to evacuation stations or to division or corps hospitals by jeep, ambulance, or other vehicles. A significant innovation and addition to the chain of medical care was the mobile surgical unit which brought the operating room many hours nearer to the wounded and undoubtedly saved numerous lives. Another equally interesting addition to the chain of evacuation was the cub airplane which was employed to evacuate casualties from forward medical installations to the division and corps hospitals, when rains and heavy traffic resulted in an almost complete breakdown of the road network on Okinawa.

Standing off the beaches were LST(H)'s which acted as evacuation control ships, and provided emergency hospital care for the seriously wounded. They performed a vital function in the chain of medical care and evacuation. Another factor which went a long way toward improving the quality of medical care and the efficiency of the chain of evacuation was the presence of a sufficient number of hospital ships, permitting a large percentage of the casualties to be cared for and evacuated by these floating hospitals rather than by APA's and AKA's. As a result, casualties arriving at fleet and base hospitals were in better condition than had been the case in earlier campaigns. Early in April the establishment of a system of daily air evacuation was also an important factor in getting casualties promptly to hospital facilities far from the scene of battle.

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At Okinawa, medical factors did not affect the campaign in any decisive manner, but they did favor the United States forces.

Enemy troops were weakened by disease to a far greater extent than were the American forces. Poor Japanese hospital conditions and supplies reduced the number of wounded returned to the lines, and along with the Japanese practice of executing the seriously wounded, they contributed to the deterioration of morale and contributed to the unprecedented number of surrenders in this campaign.

The most serious problem facing the Navy Medical Department at Okinawa was that of providing effective care and evacuation for the heavy casualties which occurred in the fleet as a result of "kamikaze" attacks upon it. Hundreds of Japanese pilots hurled their planes into the ships of the American fleet in a desperate attempt to stave off defeat. There was no way of preparing for these attacks, no way of knowing where they would strike next. After such an attack all hands who were able to carry on had to be mobilized to care for the injured and to get them to proper medical facilities. Doctors and corpsmen were called upon to improvise and to perform their duties as best they could. They left a record of achievement of which the Navy Medical Department can well be proud.

The Navy's men of medicine had traveled a long hard road from Pearl Harbor to Okinawa. Each campaign had revealed ways in which the Navy Medical Department could improve upon its operations, and as rapidly as circumstances would permit, the necessary changes were made. The chain of medical care and evacuation was modified and developed

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to meet the needs of modern warfare. New medicines were evolved; new methods and techniques were developed, and medical personnel were trained in amphibious operations. In short, by the summer of 1945 the Navy Medical Department had evolved into a smoothly running part of the larger military machine. It was in a position to provide complete and effective medical care for any estimated demands that might be made upon it.

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APPENDICES

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APPENDIX A

Hospital Ship Casualty Evacuation List

Source: Action Report, Commander V
Amphibious Force, pp. 262-263.

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APPENDIX B

Air Evacuations

Source: Action Report, Commander V
Amphibious Force, p. 270.

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APPENDIX C

Battle Casualties through 27 May
Disease and Non-Battle Casualties

Source: Action Report, Commander Fifth Fleet, pp. 43-44.

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APPENDIX D

III Amphibious Corps Casualties
(1st Marine Division, 6th Marine Division, Corps
Troops).

Source: Action Report, Commander III Amphibious Corps,
pp. 195-199.

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APPENDIX E

Naval Personnel Casualties by Ships

Source: Action Report, Commander V Amphibious
Force, pp. 264-269.

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APPENDIX F

First Marine Division
Percentages of Battle Casualties

Source: Action Report, Commander 1st Marine Division,
p. 342.

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APPENDIX G

Sixth Marine Division Casualties

Charts 1-6.

1. Total casualties.
- 2-4. Data broken down by regiments.
5. A comparison of the three regiments and the Division with reference to total casualties, etc.
6. Relative percentage, disposition. Total casualties wounded in action and deaths for the entire operation.

Source: Action Report, Commander 6th Marine Division,
pp. 91-96.

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This study of the activities of the Navy Medical Department at Okinawa is based on materials which were readily available at the time (November 1945) the writer was preparing it. It should be clearly understood that this study is not based upon an exhaustive review of all available materials since time would not permit. It is hoped, however, that it will provide a convenient preliminary survey of the subject, and will serve to bring together a body of material which will be of value to future historians.

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CHAPTER XIII

OCCUPATION OF JAPAN

With the reduction of Okinawa in June 1945, the campaign against the Japanese Empire was concentrated on the home islands. Intensified bombing and bombardment were carried out by plane and by ship. These operations were climaxed by the employment of atomic bombs against Hiroshima and Nagasaki and Russia's entry into the war early in August. Japanese surrender followed in a matter of weeks. Arrangements for the occupation of Japan were made promptly, and occupation forces began to move into the Tokyo Bay area and other strategic points during the closing days of August.

The responsibilities imposed upon the Navy Medical Department were heavy. Health and sanitation requirements had to be established, hospitals and dispensaries set up, and plans made to care for hundreds of casualties. Provision had to be made for medical logistics, burial of the dead, and evacuation of casualties. Detailed plans had to be made for the liberation, care, and evacuation of thousands of Allied prisoners of war from Japan.

An interesting account of the work of the Navy Medical Department in the Tokyo Bay area has been given by Rear Admiral (then Commodore) Joel T. Boone, (MC), USN, Fleet Medical Officer, Third Fleet. While officers of the line were occupied in working out the military details

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for the naval occupation of Tokyo Bay, Commodore Boone was conferring with representatives of the Japanese Medical Corps and with medical representatives of the International Red Cross concerning the location of Japanese prison camps for Allied prisoners in the Tokyo Bay area, and as to the condition of the prisoners. A list of those who were hospitalized in Shinagawa, including an enumeration of the seriously ill and their diagnosis, was turned over to the Fleet Medical Officer, along with a number of maps, charts, and prison lists.

Although naval landings in the Tokyo Bay area were not to take place until 30 August, it was decided that the liberation of prisoners of war should proceed at once (29 August). A group of naval officers, including Commodore Boone, departed from the USS SAN JUAN in three LCVP's to locate the Omori prison camp southeast of Tokyo.

Meanwhile, Commodore Boone had sent a note to the senior medical officer of the USS BENEVOLENCE, which was anchored in the Bay, to be prepared to screen and care for Allied prisoners of war. Only the seriously ill were to be hospitalized, while the able-bodied were to be given initial medical care and then be transferred to another type of ship. For the purpose of classification, tags with four distinctive color markings were made for all repatriated prisoners.

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As the LCVP's carrying the Americans approached the beach, a large number of prisoners of war, unclad or only partially clad, could be seen standing on the dock waving excitedly or running out on the piling. As the first LCVP arrived, many prisoners jumped into the water and swam toward the boat. Fearing that they would be injured by oncoming boats, they were urged to return to the dock. The lead boat was guided to a sewer pipe line which was supported by pilings and extended out into the channel. The American occupants of the boat clambered onto the sewer line with difficulty and made their way to the beach. The excitement of the Allied prisoners was a never-to-be-forgotten sight. As has been said, many of them were unclad, some clad merely with a G-string, others in trunks, while still others were dressed in nondescript apparel. They carried homemade improvised national flags of the United States and Great Britain. The American prisoners of war informed the group of American officers that Japanese guards were standing on the beach with fixed bayonets insisting that the Americans enter the prison through the main gate. The group followed the guides around the water front and entered the prison camp by the main gate. One of the Japanese officers present was able to act as interpreter. Some of the prisoners who knew enough Japanese were able to tell whether or not this officer was interpreting accurately. The Japanese colonel in charge of the prison camp was told that the Americans had come to liberate the prisoners of war. The Japanese

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commanding officer said that he had not been instructed by his War Department to release them. The American officers, however, declared emphatically that they represented Admiral Halsey and were under orders to liberate the prisoners and that they were to be freed immediately. The Japanese commanding officer of the camp protested, but he was pushed aside and the rescue party went into the camp to investigate the situation in order to notify the prisoners that they were liberated and to direct them to stop bowing to Japanese.

One of the first buildings entered was what was called the dispensary for the camp. A number of prisoners who were emaciated and ill looking were lying on wooden platforms without any bedding whatsoever. A room at the end of the building which served as a dressing room had a number of drugs and dressings on tables and shelves; otherwise it gave no evidence of being a dispensary as Americans know it. All ill prisoners were assembled in this building so that they might be made ready for immediate evacuation. The sick were to be evacuated first. The group of American officers circulated among the prisoners of the camp and into the various buildings to appraise the situation and to inform the prisoners that they were free. The scene was one of wild exultation. It was found that the prisoners had recently received food which had been dropped from carrier-borne planes and B-29's, and that the past day they had also received some clothing.

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With the situation in Omori camp organized, Commodore Boone, accompanied by a small medical staff, set out to locate the Shinagawa prison hospital where it was believed a considerable number of prisoners in need of medical attention would be found. When the Shinagawa hospital was reached, though not without several tense situations for the small, unarmed American liberation party, determined guards with fixed bayonets barred the entrance to the hospital grounds. Pushing the guards aside, the medical party proceeded into the compound. Through the open doors and windows of the buildings could be seen American and Allied prisoners of war. Momentarily there was no response; it was later learned that the prisoners did not know that help was so near at hand for them. When they recognized the Americans, their excitement knew no bounds. Those that were able to do so ran out of the doors and jumped through the windows and ran toward the rescue party. They were told that they were to be released and should prepare to leave immediately. The Japanese commanding officer of the camp came up to the Americans and with many bows and a manner of great friendliness invited Commodore Boone to his office. The prisoners said that the Japanese commanding officer had treated them very cruelly up until a few days previously. After the cessation of hostilities, he had, for the first time, offered them mats to sleep on and food other than rice and grass which had been their diet for a long period.

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The Shinagawa prison hospital should not, under any circumstances, have been designated as a hospital. It gave no semblance of one, being merely a series of unpainted buildings with dirt floors, stinking sickingly of feces and other human discharges. Patients were lying on platforms made of 12" boards supported by 2 x 4's which ran around the three sides of each compartment. Many of the sick prisoners were lying on bare boards but some had thin pieces of matting. There were no pillows or other head rests. As many were assigned to each compartment as could possibly lie down when packed close to one another. The only light came from a small window in each compartment. These compartments lead off from a long passageway which was without flooring. At intervals in this passageway were to be found open commodes containing much offensive liquid feces. Flies and fleas were everywhere. Many of the patients were suffering from tuberculosis and coughing and expectorating freely. The patients who could not get out of bed had to defecate right on the boards on which they were sleeping. Many of the patients were attempting to put on some clothing which had been dropped that day from airplane. The food dropped in recent days had proved to be a godsend to the prisoners.

As rapidly as circumstances would permit, transportation was organized and the unfortunate prisoners of war, both at

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Shinagawa and Omori camps, were evacuated to piers where they were placed aboard LCVP's and evacuated to the hospital ship BENEVOLENCE for further processing. Alongside the BENEVOLENCE was placed one APD at a time to load those of the prisoners who were able-bodied after they had been screened and initially cared for on the hospital ship. As soon as one APD was filled up to capacity, another took its place alongside the BENEVOLENCE.

Aboard the BENEVOLENCE, from the time the first released prisoners of war were received throughout 29-30 August, screening and care of prisoners continued uninterrupted. When received aboard, the prisoners were tagged and information gathered from them by a clerical group. They were then taken to a ward where they were stripped of all their clothing, given showers, and then issued slippers, pajamas and bathrobes. A physical examination was conducted by the medical officers of the BENEVOLENCE to determine which were ill enough to require hospitalization. The able-bodied were temporarily assigned to wards and all hands were fed. The able-bodied - irrespective of rank, rate, or nationality - were issued a new white hat, new dungarees, new shoes, socks and underwear.

It was estimated by the medical staff of the BENEVOLENCE that 85 percent of the prisoners of war were seriously affected with malnutrition. There were many cases of beriberi and tuber-

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culosis. There were a few cases diagnosed as diphtheria which, on the basis of later throat cultures, could not be proved as such. There were pellagra-infected wounds and some fractures. All were, to some extent, emotionally disturbed and exhibited marked expressions of fright. All showed evidences of intense suffering. On the other hand, the absence of psychosis among the prisoners was striking.¹

A valuable report upon the release and evacuation of prisoners of war from Japanese prison camps on the island of Kyushu is presented by the War Diary of the hospital ship USS HAVEN (AH12). On 11 September, the HAVEN, along with a number of other vessels, proceeded to Nagasaki Harbor, Kyushu, Japan. Its mission was to process and screen, medically, Allied prisoners of war; to expedite the hospitalization of those urgently in need of hospital care; to select for temporary hospital study or treatment those cases which required diagnosis or supportive and corrective therapy before qualifying for further evacuation by transport ship; and to screen out those who were free from infection and contagious diseases and who were well enough to be evacuated immediately by ordinary transports.

A preliminary survey made by the rescue teams of the Sixth Army had disclosed approximately 10,000 Allied prisoners of war on the island of Kyushu. There were 25 camps scattered about

1. Commodore Joel T. Boone, (MC), USN, "Initial Release of Prisoners of War in Japan". Mimeoographed report submitted to the Administrative History Section by Rear Admiral Boone, following an interview with this writer on 10 Jan. 1946.

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the island, all designated as Fukuoka Number 1, 2, etc. Representatives of the United States and Allied armies had already determined the military status of these men and were prepared to evacuate them to Nagasaki upon word from the Navy that the physical and personnel setup for the medical processing and screening of these men had been completed. While the HAVEN was en route to Nagasaki, a board of its medical officers had elaborated a plan for the use of a railroad siding and buildings on the dock for the reception and screening of evacuees. The number and type of personnel both medical and non-medical necessary to effect a smooth and expeditious processing and screening had been established. Arrangements were made with an accompanying cruiser to prefabricate two sets of shower lines so that the work could begin with a minimum of delay. The supply department made all arrangements for the proper clothing and feeding of the evacuees. Fortunately the railroad siding, dock area, and buildings which had been selected were found upon arrival to be sufficiently undamaged to be suitable for the project. However, a tremendous amount of clearing away of debris and of rotting grain was necessary, as was a spraying of the entire area with DDT powder before carpenters and plumbers were able to set up the showers and prepare the other required spaces. The ordinary labor was done by Japanese labor groups under the supervision of the United States Army; the technical work was done by rated men from the United States Navy ships. The HAVEN was docked alongside the selected

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area and a steam line connection from it to the shower pipe furnished warm water. The Nagasaki water facilities on the dock were found to be intact and adequate, and preliminary testing indicated the suitability of the water for shower purposes. Word was given to the Army and Allied representatives that processing could begin at 0800 on 13 September (one and one-half days after the HAVEN's arrival) and the first train arrived at that time as per schedule.

Selected medical personnel from the USS HAVEN were sent to the various camps to study camp conditions as they influenced health, and to designate those cases requiring urgent hospitalization and early evacuation. The plan was to evacuate approximately 1,000 men per day in three train loads, to arrive at 0800, 1200, and 1530. All stretcher cases were to be placed on cots in a coach set aside for that purpose.

Upon their arrival at Nagasaki, obvious stretcher cases were carried from the train by stretcher teams of hospital corpsmen, taken into an adjacent building, divested of their clothing, sprayed and dusted thoroughly with DDT after being given a "bed-bath", and routed directly to a designated bed on a hospital ship by a routing medical officer. No attempt was made to interrogate or to check these patients before admission. All other prisoners of war were directed along a one-way maze which

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led them respectively past (a) tables at which officers of the Nurse Corps from the HAVEN obtained general health data on a mimeographed form;² (b) an enclosed undressing area where clothes were discarded or, if desired, were put into a sea-bag, tagged, and sprayed with DDT; (c) shower lines where water and soap were plentiful; (d) a delousing area where the patient was thoroughly dusted with DDT by a team of hospital corpsmen; (e) a medical screening area where, with the aid of the preliminary questionnaire filled out by the officers of the Nurse Corps, the POW was inspected and examined by medical officers; (f) the clothes reclaiming and new-issue area manned by members of the supply department; and (g) the final dressing area where the POW donned fresh clothing before being directed to a waiting transport ship.

A statistical analysis of the medical processing and

2. This form was as follows:

POW GENERAL STATISTICS

Name..... Nationality.....
Date Captured:.....
FOOD: (Insufficient), (Bad), (Fair), (Good), (Insufficient)
[Sic.; probably sufficient]
Fever, Chills: (Yes) (No), Dental Trouble: (Yes) (No),
Lice: (Yes) (No)
Dysentery: (Yes) (No), Swelling of hands or feet: (Yes) (No)
Skin Trouble: (Yes) (No), Loss of Weight.....lbs.;
Cough: (Yes) (No)
Blood Spitting: (Yes) (No)
REMARKS:

(Source: War Diary USS HAVEN, Sept. 1945, p. 7).

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screening of the 9,043 Allied prisoners of war from camps in southwestern Japan (Kyushu) provides the medical profession with much valuable data. The presentation deals first with general information obtained from the entire group. This concerns itself with age, nationality, the presence or absence of fever, chills, dental trouble, edema, dysentery, skin trouble, malaria, lice infestation, respiratory infection, tuberculosis, and weight loss. The second part of the presentation concerns itself with an analysis of 717 of 888 patients admitted to the hospital ship USS HAVEN. This group was selected from among the entire prisoner of war group as those requiring hospital care or further study before being allowed to be evacuated further by ordinary transport methods. In this latter group the analysis is divided into two parts: (1) data obtained on questioning after admission to the hospital ship and (2) physical and technical findings after examination and study. The results are itemized and commented upon briefly under separate headings. A special section is devoted to a detailed description and comment upon a large group of cases of beriberi and related cases of edema.

The study disclosed certain features which merit further comment or reiteration. It is possible to set up quickly the physical and personnel facilities necessary to process medically large groups of prisoners of war, and to carry out such processing

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with a minimum of confusion and delay. It is of particular importance to bathe the prisoners of war thoroughly and to de-louse them and their clothing by the generous use of DDT powder. Seriously ill patients can be given a "stretcher bath" and de-loused before admission with very little delay or inconvenience. This procedure is recommended in order to prevent hospital infestation with body lice.

Dental decay, weight loss, edema, and other evidence of nutritional or deficiency disturbance were much less conspicuous among the Javanese Dutch than in the other groups. This is explained by the fact that the Javanese are better adapted to rice, which was the chief component of the prison camp dietary. Respiratory infections had been very common among the prisoners of war; tuberculosis was especially prevalent. Apparently there had been a fairly high morbidity and mortality among the prisoners from pneumonia and this is readily understandable when one considers that these men, improperly clothed and debilitated from other causes, were subject to the rigors of cold damp winters, after having come from tropical or subtropical climates. Tuberculosis, as was expected, was more common than in a comparable age group of military personnel under normal military conditions of living. Malaria had been rife in the Philippine camps and in Burma and Thailand, but by the time that the men were liberated, it had ceased to be an important health disturbing factor by virtue of treatment and the natural course of the disease.

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Sixty-four percent of all the prisoners of war complained of body lice infestation. This is a relative index of the unsanitary conditions which existed and the opportunity for louse-borne infection. Forty-two percent complained of edema at some time during their confinement. This figure does not represent the true incidence of edema, however, because many were unaware of its presence when it could actually be demonstrated by the medical examiner. How much of it was due to anemia and hypoproteinemia, and how much of it was due to the wet form of beriberi is difficult to state. It is important to emphasize that the sudden acquisition and ingestion of large quantities of food (and salt) dropped among the camps by our B-29 airplanes after August 15th was associated with the rapid appearance of massive generalized edema in a large percentage of the prisoners of war. Among anemic, debilitated individuals already suffering from the nutritional deficiency and disturbances of water and salt balance, it is unwise to make large quantities of food and salt available without emphasizing at the same time the importance of careful eating, low salt intake, and high vitamins - particularly B1 - until proper water and salt balance has been restored. Weight loss was marked, and 75 percent of the entire group lost from 11 to 50 pounds. Many lost 80 to 100 pounds.

Analysis of the hospitalized group of 888 served to emphasize those features already commented upon. Beriberi or

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closely related cases of edema were the most common disorder among this group, being present in 326 of the 717 patients whose charts were sufficiently complete to warrant inclusion in this study. In 248 patients beriberi was the primary cause for hospitalization, and 213 of these cases were of the wet form. Respiratory infections, chiefly tuberculosis (64 patients), chronic bronchitis (25 patients), and atypical pneumonia were the next most common disorders in this group. Infectious jaundice was not infrequent and two patients with fever were determined to have typhus fever. Fractures of all types and infected amputation stumps were also common. Active malaria was encountered in only 10 patients and they were all of the relatively benign tertian type (*p. vivax*). Twelve cases of severe burns were admitted, 9 of which were due to the atomic bomb.

Visual disturbances were frequent, as is common in patients suffering from the nutritional or deficiency disorders. The vision of only a relatively small percentage was brought to normal after correcting the refractive errors.

A striking observation was the absence of psychoneurosis in this large group of men. This seems phenomenal when one realizes the normal incidence of psychoneurotic disorders and tendencies in any large military body. There were two frank psychotics requiring

lock ward security but this incidence was far below the number one would expect from a group of similiar size living under far more favorable circumstances from the standpoint of mental hygiene.

It is interesting to speculate as to the reason for this remarkable state of affairs in the psychiatric field. It must be remembered that internment in the Japanese prison camps involved a return to extremely primitive living standards for most of the prisoners. The instinctual drive of self preservation prevailed and the thoughts of all the prisoners were devoted chiefly to food and protection. As one prisoner put it, "All you had on your mind was food--all conversation centered around food and getting through another day." The usual psychic mechanisms by which adjustment is made in our ample environment were useless and even dangerous.

From interviewing many of the prisoners, the opinion was gained that those who developed incapacitating psychic difficulties did so early in their confinement when the attitude of their captors was most brutal. As a result, the mentally as well as the physically incapacitated fell victims of the brutality. It became a matter of survival of the fittest. Stated very bluntly it appears that those who developed psychoneurotic symptoms were either "killed or cured" by the Japanese methods. One might well conclude as a suggestion in psycho-therapy that when psychoneurotic manifestations avail a person nothing, least of all the evocation of sympathy,

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they are quickly dropped.

There were three deaths in the entire hospitalized group. One death was directly attributable to beriberi heart disease; the other two deaths were due to advanced tuberculosis. In this connection it is interesting to comment upon the mortality rate in the prison camps where careful records were kept. In camp Fukuoka Number 17 at Omuta, in a population of 1,709 POW's, there were 118 deaths exclusive of 5 executions over a period of two years. This is an incidence of 32 per 1,000 per year. In camp number 11 there were 25 deaths in a period of slightly less than two years in a population of 402 giving an incidence of approximately 25 per 1,000 per year. These figures may be compared with an expected incidence of 3 to 4 per thousand in a military group not engaged in actual combat. The death rate of 6 to 10 times greater than normal in these camps is the best indication of the privations and hardships suffered by the prisoners of war.

Finally, it is worthy of comment that the sending of supplies by international relief agencies to prisoner of war camps does not discharge their full responsibilities. Some method of enforcement to make these supplies actually available to the prisoners is necessary. Medical supplies, for instance, had been sent to the camps in adequate amounts by the Red Cross, but they were not available in adequate amounts because their distribution was usually

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controlled by Japanese privates or non-commissioned officers who had neither the inclination nor the knowledge necessary for their effective use and distribution.³

In addition to its work in processing, caring for, and evacuating prisoners of war, the medical staff of the HAVEN had a splendid opportunity to observe the appalling effects of the single atomic bomb which had been dropped on Nagasaki. In the large area chiefly affected, loss of property and of life was practically complete. In the surrounding area, while the destruction was widespread, it was of less magnitude and many persons were not killed outright by the explosion. Many of the injured have died since; others have recovered or are recovering. Independent of mechanical or thermal injuries or the state of healing, there frequently developed signs and symptoms of an unusual syndrome which was in itself usually fatal. Observations were made on the pathology in those persons who developed the syndrome, together with a study burns due to the atomic bomb.

The HAVEN, moored to a dock in Nagasaki harbor, began to receive prisoners of war 35 days after the bombing. It required a period of two weeks to complete the task. About a mile from the ship was a relatively intact schoolhouse which was being used by the Japanese as a hospital. There were about 300 civilian patients in the building. A detailed report was prepared by the

3. This account is largely a paraphrasing of materials found in the War Diary of the USS HAVEN (AH12) for the month of September 1945, Nagasaki, Japan, pp. 1-21.

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medical staff of the HAVEN, based upon information obtained from that hospital and from observations made on prisoners of war who were admitted to the ship for the treatment of burns of the skin caused by the atomic bomb.

Procurement of information on the Japanese victims of the atomic bomb (from the hospital) presented several difficulties. For one thing, the information was obtained during an extremely busy two week interval when the HAVEN's laboratory personnel were performing nearly 6,000 tests on patients aboard. In addition, there were language difficulties; specimens could not be brought promptly to the laboratory in all cases; there was a complete lack of facilities at the civilian hospital for refrigeration of bodies after death and prior to postmortem examination. Nevertheless, it is believed that the report made by the medical staff of the HAVEN on clinical and pathological observations on the effects of the atomic bomb contains much valuable information.⁴

4. This account is largely a paraphrasing of materials found in Enclosure B of the War Diary of the USS HAVEN for the month of September 1945, Nagasaki, Japan, pp. 22-52.

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B I B L I O G R A P H Y

Neither the time nor the documentary materials were available for a detailed study of the medical aspects of the occupation of Japan. However, it was believed to be desirable to indicate, at least briefly, the role of Navy medicine in the care and evacuation of Allied prisoners of war, and the medical observations of Navy doctors on the effects of the atomic bomb at Nagasaki. The four sources used in preparing these notes have been indicated in the footnotes.

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PART IV

THE ALLIED INVASIONS OF NORTH AFRICA AND EUROPE

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CHAPTER XIV

NORTH AFRICA

Medical Plans for the Assault

President Roosevelt's announcement on 8 November 1942, that United States forces had landed that day on the Mediterranean and Atlantic coasts of North Africa, brought to the realization of the American people that the war was being fought in earnest on the fringes and approaches to Europe. The long months of planning, preparation, and training were now to be tested in battle. The successful outcome of this first real thrust against the power of Germany and Italy was imperative if final victory was to be effected.

Simultaneous assaults were made on Casablanca, Oran, and Algiers in the regions of Morocco and Algeria, leading to the complete occupation of French North Africa on 11 November 1942. The United States Navy was a key factor in the final outcome, particularly in Morocco, largely because of the amphibious nature of the landings and necessary naval attacks on coastal fortifications and units of the French fleet. By the same token, the Navy Medical Department assumed its combat role and responsibilities immediately.

The invasions of North Africa were successful, both militarily and medically. In spite of the large scale of operations, loss of personnel was relatively slight. The estimated total of casualties amounted to little more than 2,000 of which about one-half were wounded and the remainder killed or missing. Many of those missing, prisoners of

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the French, were subsequently returned to their respective units. ¹

Much of the success of the North Africa operations may be traced to careful planning before the invasions, full cooperation between the forces entailed, adequate establishment and use of ship and shore facilities, and proper preventive medicine precautions and practices to keep casualties at a minimum. The U.S.Navy Medical Department played an important part in all of these phases.

Full use of ship facilities was contemplated by the Navy Medical Department in the invasions of North Africa. For example, in the Safi area of Morocco, plans called for Navy responsibility for the medical care of personnel of all services between the port of embarkation and the high water mark on overseas beaches, including evacuation and hospitalization afloat. As visualized, transports (AP's) were to serve for seaward evacuation of casualties; AK's were to be prepared to receive small numbers of the less seriously wounded; and combat ships were to care for their own casualties, unless they became overloaded - in which case casualties were to be evacuated to the AP's. Army personnel, if able to return to duty within 30 days, ² were not to be sent to the transports.

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1. Bureau of Naval Personnel, Information Bulletin, No. 315, Washington, D. C., June 1943, p. 4.
 2. From the Commander Southern Attack Group (Commander Task Group 34.10) to the Commander Western Naval Task Force (Commander Task Force 34), "Annex Easy to ComTaskUnit 34.10.2, Landing Attack Order No. 2-42," in Operation Torch, Assault on Safi, French Morocco on 8 November 1942, 24 Nov. 1942, p. 102.

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Specific instructions provided further that: (1) wounded were not to be evacuated until the assault troops had been landed, except that men wounded in landing craft enroute to the beach were to be returned to transports; (2) transport beachmasters attached to shore parties would be responsible for removing the wounded from beach evacuation stations and placing them in boats assisted by medical action of the shore parties; (3) the evacuation of wounded was to begin with the second trip of the boats, unless it became necessary to make a rapid landing of vehicles, in which case the beachmaster was to be notified; (4) boats would return the wounded to the transports from which they were working, unless otherwise directed; (5) advantage was to be taken of placing wounded directly on ships at docks in Safi Harbor to the limit of the capacity afloat to care for the wounded; (6) boats with wounded aboard, on return to the transport, would be hoisted to the rail on the side davits for disembarkation; (7) the exchange of litters, blankets, etc., with beach evacuation stations was to be carried out; (8) reports as to the number of wounded aboard transports and remaining accommodations would be made every two hours; and (9) the commander of the transport group was to be informed every two hours by the regimental beachmaster as to the number of casualties ready for evacuation, with similar reports to be made to the regimental beachmaster by the battalion beachmaster.

As finally organized under this plan, the USS HARMIS (APA), for example, was prepared to receive 200 bed and 1,000 ambulatory

3. Appendix 1 to "Annex Easy, Medical Plan ComTaskUnit," Ibid., pp. 103-104.

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casualties. Her medical unit, composed of a beach party of 1 medical officer and 11 enlisted men, a main battle dressing station of 2 medical officers, a dental officer, and 15 hospital corpsmen, a forward battle station of 2 medical officers and 8 corpsmen, and an after battle station of 1 medical officer and 6 corpsmen, was ready to⁴ meet all battle contingencies.

The use of hospital ships, in addition to transports, was planned for the Algiers area, where several were to arrive on D plus 3 days. One hospital ship was to be retained at Gibraltar until D plus⁵ 4 days for severe casualties.

Naval medical plans, contemplating the maximum use of shore facilities, were also completely formulated prior to the landings on 8 November. Illustrative is that for the Oran area which stated:

1. Mission

(a) - The mission of the Medical Department is to provide adequate medical and surgical care, including preventive hygienic and sanitary measures, during an overseas movement of Navy personnel totalling approximately 750 officers and men, and subsequent to landing and establishing an overseas base. In view of the fact that the Navy personnel are to accompany a large movement of and landing by Army personnel, close collaboration with the Army Medical Corps is essential and they can be counted on for certain assistance. 6

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4. "Landing Operations, Blackstone, Report of Medical Department," from the Medical Officer to the Commanding Officer, USS HARRIS, Ibid., pp. 189-202.
 5. Office of Naval Commander, Eastern Task Force, Naval Party 625, Operation Order No. 26, London, 5 Oct. 1942.
 6. J. W. Vann, Captain, (MC), USN, Staff Medical Officer, "U. S. Naval Base Poker, Medical Plan," p. 1.

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The premises on which this mission was based were (1) the assault, landing, and seizure of the base were to be accomplished by the Army; (2) the first group of Navy personnel would land shortly after the assault troops; (3) some opposition would be encountered by Navy personnel and casualties might be expected; (4) the area occupied was to be available for establishing a naval base by the time the Baker party of naval personnel arrive; and (5) the sanitation and health conditions in the area of employment were such that certain precautions and preventive measures would have to be taken to safeguard the health and the care for any sickness that might be expected.⁷

The methods of accomplishing the mission included: (1) preliminary preparations, which stressed instructions on personnel selection, preventive measures, identification tags, health records, health and sanitary conditions to be expected, and training; (2) procedures enroute, including preventive measures to be completed and training to be continued; and (3) procedures during and subsequent to landing. This last was most explicit:

1. Preventive measures to be kept up to date at all times.
2. Care of the wounded. Naval casualties that occur during the actual landing are to be cared for on the spot by Naval medical personnel accompanying the landing party who will give such first-aid measures as circumstances permit. It is also visualized that Army medical personnel and Army first-aid stations will assist. Army collecting and clearing stations and Army hospitals are to be considered as available to a great extent. Subsequent to the establishment of a dispensary at Bluff (Oran) and sub-dispensaries at Tufton and Rib (Mers-el-Kebir and Arzew)

7. Ibid.

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the casualties will be cared for by those activities and cases requiring hospitalization are to be transferred to Army hospitals. Careful records are to be prepared and submitted in accordance with Allied Force Headquarters Circular No. 1

3. Care of the sick. Enroute in transports the naval medical officers will hold sick call and assist the transport medical department in every way possible. Cases requiring admission to the sick list are to be cared for in the sick bay or hospital spaces of the ship in which embarked. During landing operations and subsequent to loading, the routine sick are to be cared for at the Naval dispensaries to the extent of the capacity of these dispensaries. Patients requiring hospitalization are to be transferred to designated Army hospitals in the area. Records will be prepared and forwarded in accordance with existing instructions.
4. Care of the dead. The dead will be disposed of in accordance with instructions contained in Allied Force Headquarters Circular No. 2. 8

The plan further provided for the logistics of medical personnel and supplies. Three medical officers, 1 dental officer, and 12 hospital corpsmen were provided -- 2 medical officers and 4 hospital corpsmen to accompany D-day convoy; 1 medical officer and 1 dental officer, in addition to 8 hospital corpsmen, to accompany D plus 3 convoy. Each was to carry appropriate field medical kits, and a brassard was to be worn by each of the medical personnel. Medical supplies were to include the medical supplies and equipment of one Navy standard 20-25 bed dispensary unit. Water was to be obtained from the Army Medical Supply Depot, or Base Two, as circumstances warranted.
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8. Ibid., pp. 4-5

9. Ibid., p. 5.

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So far as the Army was concerned, it was known that provision had been made during the landing for the Army to provide first aid and to establish battalion first-aid stations. These were to be followed by division medical battalions and medical personnel to furnish collection facilities and clearing stations. At D plus 4 hours one surgical hospital of 250 beds was to be set up ashore to care for casualties. At D plus 8 hours one evacuation hospital of 750 beds was to be set up to care for casualties. After the occupation, by D plus 13, there was to be one general hospital of 1,000 beds. Later, a medical field laboratory and a medical supply depot were to be established.¹⁰

The medical plan for Oran concludes with the following summary:

- a. The Army medical plan provides sufficient definitive hospitalization in the zone of U. S. Naval employment to care for all anticipated Naval casualties. With that assurance it remains for the Navy to furnish its own dispensary, medical and dental services at Bluff, Tufton and Rib.
- b. It is believed that the standard 20-25 bed Naval dispensary will permit the establishment of a main dispensary at Bluff, and a subsidiary dispensary at Tufton and Rib, the personnel and supplies to be furnished from Bluff as circumstances dictate. Ambulances will have to be obtained from the Army or requisitioned locally. The dead will be buried locally in accordance with directive contained herein. Subsequent evacuation of casualties will be at times and by such means as conditions permit. 11

10. Ibid., p. 6.

11. Ibid.

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The Assault

When the landings began, American armed might faced a test which could easily have meant a great national disaster if it had failed. The long ocean voyage necessary deprived our forces of nearby bases from which to recoup and draw reinforcements. This fact made the responsibilities of the medical department of utmost importance. Should heavy casualties result, as was expected in many quarters, the effectiveness of the medical department in returning casualties to duty would be a significant factor in recouping American losses. As events transpired, it was the good fortune of American arms that casualties were light-- this despite heavy seas developing at the time of the landings which wrecked many of the landing craft, especially in the Morocco area, as they hit the beach.

Ship-based medical facilities did, however, play their part in the invasion. Besides handling routine work aboard, they formed, at times, effective liaison units with the shore. An example was the USS BARNEGAT, which had anchored in the Sebou River in the Port Lyautey area of Morocco, and had furnished medical aid there during the landings. Beach parties from transports also gave substantial aid. Going ashore in various types of landing craft, including LCP(L)'s, and LCP(R)'s, LCS(L)'s, and LCM's, both personnel and supplies were adequate to meet medical needs.

A report of the USS HARRIS indicated that about one-half hour after the landing at Safi, the general care of casualties had begun. The corpsmen in the early waves treated and evacuated about

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5 casualties from the Blue Beach as soon as the assault waves were in and before they had been joined by the medical officer. Communications had been established on D plus 1 day between the medical beachmaster and the ship and regimental beachmaster. At that time a battalion aid station was established on the shore end of a phosphate dock; henceforth casualties were moved to that station. When casualties were ready to be evacuated, they were transferred from the battalion station to the medical beach party for transportation to the ship. The regimental surgeon at this time ordered all casualties to be transferred to ships even though their apparent morbidity was less than 30 days.

Continuing, the report of the USS HARRIS pointed out that the treatment of casualties during the first day consisted of the applications of powdered sulfonamides to wounds, of splints to fractures, and the administration of morphine by syrette. In one case, plasma was administered after the casualty had been removed to the boat. Twenty-five casualties in all were treated and evacuated. Distribution of the casualties to the ships was entirely on the initiative of the medical officer and corpsmen on D-day. On D plus 1 day orders were received to evacuate the remaining casualties to the USS LYON and USS CALVERT. A few men were placed in returning boats, thus reducing the delay. The rigging installed for tiering patients in the boats was not utilized in this phase of the operations. The transfer from boat to ship was accomplished by means of a double litter lift raised by the single whip boom. All casualties were placed on the port or starboard quarter-deck and were later moved to the main

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battle station. Of the casualties, two of the Army died and were transferred to the Army field hospital ashore for disposition. Twelve casualties and 2 sick were transferred to the Army field hospital just prior to sailing; 10 were retained on board. Despite little rest for about 80 hours on the part of the crew of the USS HARRIS, all evacuation¹² was accomplished without incident.

The experience of the USS THOMAS STONE (APA) was unique in the North African invasions. Early in the engagement this transport was beached approximately 100 yards from the exposed sandy beach at Algiers. Deprived of flotation and means of propulsion because of torpedo and bomb casualties before and after the invasion, the ship was in other respects in perfect condition. While in this condition, she was able to shoot down at least two planes, and was used extensively as a berthing and receiving ship. Her excellent sick bay proved to be a helpful supplement to the U. S. Naval Dispensary established shortly after the capitulation of Algiers particularly with respect to surgery, dentistry, laboratory work, and roentgenology. Although work was hampered at times by rough weather and resultant high waves which made it difficult to approach the ship, a reporting officer stated that "from all evidence at his disposal, the medical department of the ship functioned during battle in accordance with the best tradition of the Navy."¹³

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12. "Landing Operations, Blackstone, Report of Medical Department", pp. 189-202.
13. Historical Supplement to the Annual Sanitary Repory, 1943, USS THOMAS STONE,,p. 11.

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Land-based facilities had become well established shortly after the invasions had taken place. A memorandum of 21 November 1942 from Capt. J. W. Vann, (MC), USN, indicated that medical facilities, (largely Army installations), in the Oran area included the 77th Evacuation Hospital of 750 beds, which was to be moved to Senia, about 6 kilometers from Oran. It was to be replaced by the 7th Station Hospital in Oran, having 650 beds in addition to 100 beds for sick officers and nurses. The 38th Evacuation Hospital of 750 beds was functioning under canvas at St. Cloud, about 20 kilometers from Oran. Furthermore, the 48th Surgical Hospital was functioning in the French Army barracks at Arzeu; the 9th Evacuation Hospital of 750 beds was to be established at Sainte Barbe du Tlelat, about 25 kilometers from Oran; and one or two general hospitals of 1,000-bed capacity were to be established in or near Oran. A medical supply depot had also been established in Oran, from which the Navy was to draw its supplies. In addition, sufficient ambulances were to be provided for the Navy; burials were to be made in the American Cemetery at Oran; the water supply was sufficient, although in need of boiling or chlorination; and the naval dispensary in Oran was sufficient to supply prophylaxis for naval personnel.

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A subsequent memorandum of 28 November 1942 from Captain Vann indicated that the medical plan had been carried out in most of

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14. Memorandum of 21 Nov. 1942 to the Commandant, U. S. Naval Operating Base, Center Task Force, Oran, Algeria, from J. W. Vann, Captain, (MC), USN.

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its details. Medical supplies had arrived safely and were put to use, and the Army had succeeded in landing and had established its own medical facilities, which were available to U. S. naval forces. Certain local conditions had not been anticipated: (1) the unexpected working arrangements of the port of Oran; (2) the resultant distribution, billeting, messing and employment of U. S. naval personnel, (3) the medical care of Royal Navy personnel; and (4) the medical care of Armed Guard and Merchant Marine personnel during their stay in port. Sick bays with ample supplies and medical personnel had been established for the U. S. Navy at Mers-el-Kebir and Arzeu; and a dispensary, at Oran. Recommendations were listed for the handling of Royal Navy personnel, ships of the Merchant Marine, provision of ambulances, and evacuation of patients to facilities in the Zone of the Interior (under the cognizance of the surgeon of the Second Corps, U. S. Army) and then direct to the United Kingdom and the United States. ¹⁵

Meanwhile, medical facilities were also established in Morocco. In the Casablanca area, the first Navy medical personnel destined to establish permanent shore establishments debarked at Fedala on 10 November 1942. Consisting of three medical officers and eight hospital corpsmen, they established a temporary barracks and a small sick bay in a camel barn on the dock. Supplies, slow in coming ashore, consisted for the most part of the medical packs of

15. Memorandum of 28 Nov. 1942 to the Commandant, U. S. Naval Operating Base, Center Task Force, Oran, Algeria, from J. W. Vann, Captain, (MC), USN.

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these personnel, as well as material which could be gathered from other sources. On the night of 10 November, transport sinkings from submarine action resulted in several days' work, in which the Army and the Navy fully cooperated to care for the survivors who reached shore.¹⁶ Subsequently, a dispensary was established at Fedala.

Other facilities were forthcoming with the establishment of a first-aid station in the port area of Safi on 9 November and a sick bay at Casablanca on 12 November. On 18 November a group of medical and dental officers arrived to establish the first dispensary at Casablanca. A permanent dispensary was established on 7 December 1942 in a clinic formerly operated by a French physician and surgeon. "In this building there was room for 54 beds, a good surgery ready for occupancy, X-ray equipment, etc., which permitted¹⁷ the medical and surgical units to start functioning at once." To meet increasing needs, several neighboring villas were occupied until space for 210 beds became available.

A permanent dispensary was established on 1 January 1943 at Safi in the building of the Regie Tonacco Company. At Port Lyautey, a naval dispensary was opened 1 February 1943—previous needs having been met by medical beach parties during the invasion, by medical units of the USS BARNEGAT, which had anchored in the Sebou River,

16. Historical Data Report, 8 Nov. to 31 Jan. 1943, of U. S. Base Hospital No. 5, pp. 1-2.

17. Ibid., p. 2.

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and by the VP73, which had arrived from Iceland on 15 November to
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set up a sick bay.

Conclusion

The invasions of North Africa were remarkable, insofar as the success of the operations and a minimum of casualties were concerned. Adequate planning, the successful establishment and use of ship and shore facilities, the full cooperation between the Allied forces concerned, and proper sanitary practices and precautions served to keep casualties in this area to a minimum. This engagement was one where the greatest possible use was made of land-based medical facilities. Little immediate seaward evacuation was necessary; nevertheless, the lessons learned made it possible to carry out the subsequent invasion of Sicily with greater effectiveness in July 1943.

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18. Historical Data Report, Fleet Air Wing No. 15, 1943,
pp. 1-2.

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CHAPTER XV

SICILY

Preparations

Sicily, protruding westward into the Mediterranean from the toe of the Italian boot, was selected as the next objective for invasion and conquest after the successful occupation of North Africa. Beginning with amphibious landings on 10 July 1943, the Sicilian campaign was brought to a successful conclusion a little more than a month later. Again the U. S. Navy Medical Department played an important role, as it had in the invasions of North Africa some seven months earlier.

Medical plans were thoroughly formulated prior to the invasion of Sicily. As visualized, the function of the Navy Medical Department during the invasion would be: (1) to provide medical and surgical care to all personnel on all Navy vessels from the time of embarkation until they landed on the invasion beaches, and (2) to evacuate the sick and wounded from the beaches during the assault phase and until adequate medical facilities were established ashore. To carry out this function, the larger ships were to hold separate sick calls for Army and Navy personnel aboard, with Army medical officers present to assist in making required Army records; in the smaller craft, boat crews were to be thoroughly indoctrinated in first-aid procedure. The

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evacuation organization was to be composed of Navy beach battalions, ambulance boats, evacuation ships, and hospital facilities on friendly shores.¹

Preparations for the coming invasion entailed extensive activity prior to the landings. In addition to the necessity of augmenting Navy medical personnel, training programs were instituted on a large scale to assure the success of the landings. Repeated experience had demonstrated the necessity of adequate first-aid instruction for all personnel; hence general instructions were given to non-medical personnel in the form of lectures, visual aids, and practical demonstrations. Landing craft crews were given advanced training. Medical personnel, especially the components of beach parties, received completely reorganized courses of instruction, much of which was developed and inaugurated at Fort Pierce, Florida. Afloat, medical departments received general information on sanitation, casualty handling from shore to ship, and medical service for amphibious operations. Detailed information included data and instructions on the identification and disposition of remains, casualty reports of sick, wounded, dead, and missing, and instruction of Navy personnel in the use of Army medical records. Joint medical training with the Army on amphibious operations was conducted at Solomons Island, Maryland.²

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1. "Action Report, Western Naval Task Force, the Sicilian Campaign, Operation 'Husky', July - August 1943," p. 102.
 2. "Report of Medical Service in Operation 'Husky', Cent Area," 22 Sept. 1943, pp. 2-7.

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Medical supplies and equipment were also handled with dispatch. Most of the necessary critical supplies were gathered through the cooperation of the Bureau of Medicine and Surgery and the Naval Medical Supply Depot, Brooklyn, New York, and the Medical Storehouse, N.O.B., Norfolk, Virginia. The commissioning allowances for landing craft were augmented, especially for LST's, which were to play a prominent part in the invasions. It was anticipated that a sufficient number of medical supply units could be placed aboard these craft prior to departure on an operation to meet the anticipated needs, should these vessels be assigned to evacuate wounded. The authorized allowance of medical supplies for beach parties was also augmented by a special Medical Resupply Unit developed by the Sixth Amphibious Force.³

Medical evacuation plans were carefully formulated. So far as the Navy was concerned, its responsibility extended primarily to combat loaded transports, LST's and smaller types of craft, beach evacuation stations while under the control of naval beach parties, and wounded prisoners of war, who, under the cognizance of the Provost Marshals concerned, were to be accorded the same treatment as other casualties. The Army was also to use LST's, to which Army Medical Corps personnel were assigned. The Army's responsibility extended from the ports of embarkation to the points of debarkation in the theatre of operations. Casualties

3. Ibid., pp. 6-7.

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received aboard these vessels were under the care of the Army until evacuated to other Army or Navy facilities ashore or afloat. In addition, DUKW's were to be used by the Army to transport wounded from evacuation stations to evacuation ships. Hospital ships (unless British or Canadian) and beach evacuation stations(unless otherwise specified) also came under the jurisdiction of the Army.⁴

Plans for casualty evacuation by sea provided for two distinct stages: (1) the assault stage, which covered the evacuation seaward of all ineffectives, when practicable, until the divisional phase, a seven day policy after D plus 3 days, and the transport of casualties from the beaches to the Tunis-Bizerte area, with any overflow to Bone by hospital ships and carriers and to Oran by combat loaders; and (2) the later stage, in which casualties were to be transported from the beaches and small southern ports to Tunis-Bizerte, Bone, and Oran. Casualties with more than three months' hospital expectancy were to be transported from North Africa to the United States, unless unable to stand the voyage:

The plan of evacuation further provided: (1) except for ineffectives resulting from casualties occurring in landing craft enroute to beaches, for whom first aid is to be given, no casualties

4. "Appendix One to Annex H to Task Force 85 (Cent Attack Force), Landing Attack Plan, No. 4-43", pp. 1-4.

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would be evacuated seaward until the assault battalions had landed; and (2) all seaward evacuation of wounded was to be controlled by Navy beachmasters, who were to determine the means and ships to which they should be sent. Using any boats available, wounded were to be evacuated seaward to transports, LST's, hospital ships, and hospital carriers (British cargo vessels converted for hospital use). LST's having a complement of 4 to 6 enlisted men of the Hospital Corps and 1 medical officer were to be considered as ambulance ships available to transport casualties not requiring major medical procedures from the beaches to hospital facilities on friendly shores. Hospital ships, hospital carriers, and transports were to be available for the evacuation of the more seriously wounded to Oran and the Tunis-Bizerte area, or to the United States. Combatant ships were, ordinarily, to care for their own casualties, unless overloaded--at which time they were to evacuate them to transports or other facilities. As required in the North Africa invasions, adequate steps were to be taken to report casualties, and to identify and dispose of remains.⁵

The Landings

The landings on Sicily were accomplished without great difficulty. The voyage was routine and operations were conducted in accordance with landing attack plans. Medically, all went well. Fortunately, the casualty estimates proved to be more than adequate.

5. Ibid.

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Tactical surprise had rendered impotent many of the defense features which would have contributed to a high casualty rate. In the Licata area, as transports were not available, all evacuation was made to LST's. Losses there were slight at first. Gela and Scoglitti, the other main areas of amphibious landings, used all medical facilities extensively. As summarized for the Scoglitti area:

The evacuation and care of the wounded was efficiently and expeditiously handled. No serious congestion or marked delay was reported at any time. The Army collecting companies and the naval medical components of the beach parties gave excellent first aid to the wounded prior to their evacuation from the beaches. Because of the relatively light casualty load, transport medical staffs rendered more definitive treatment than is usually possible in this type of military operation. All the aforementioned, plus the excellent facilities available and new modern approaches, minimized the mortality and the period of morbidity.⁶

The reporting of casualties by various transports to the area evacuation officer was more rapid than had been expected. This was due to the excellent communication procedure established, and the simplicity of the type of report used. Following is an example:

(1) Beach Party Reports:

Stretcher 20 Total 40 x Dead 0 x 0800

6. "Report of Medical Service in Operation 'Husky', Cent Area", p. 9.

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(2) Transport Reports:

Bed 25 Total 50 x Dead 1 x 0900 7

From these reports the number of seriously or critically wounded and the number of ambulatory cases could be ascertained. On D-day and D plus 1 day, evacuation in the Scoglitti section was so rapid that beach reports of casualties beginning at H plus 6 hours, and continuing every six hours thereafter, became ineffective or redundant.

The evacuation of the wounded in the Scoglitti area is further illustrative. The organization ashore consisted of the beachmasters assisted by the medical section of the beach party, and the area evacuation officer assisted by the division medical officers of the transport division flagships. Casualties from the landward side were delivered to the beach evacuation station on the beaches by the Army collecting companies. The evacuation of the wounded began on the second boat trip after the assault troops were landed. Troops injured enroute to the beach during the assault phase were returned to the ships. Resistance, slight during the initial landings, did not become heavy until the advancement of troops inland. On D-day and D plus 1 day casualty evacuation was rapid, but was slowed considerably, thereafter,

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7. "Medical and Evacuation of the Wounded Report, Cent Areas One and Two, Operation 'Husky'," from the Evacuation Officer, Cent Area One and Two, to the Commander Task Unit 85.1.2, July 1943, pp. 1, 15.

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because of the congestion of landing and evacuation craft on the beaches. Until this time LCVP's had been primarily used for evacuation. LCT's were then used to relieve the congestion. However, the congestion of boats did not result in serious delay in evacuating the wounded.

Most of the wounded were evacuated to AP's and APA's, with smaller groups going to AKA's. Upon arrival at these ships, the majority were unloaded at the rail or hoisted by the Milles-Harris sling. None of the transports reached their capacity for casualty handling, and, with few exceptions, there was an equable distribution of casualties aboard these ships. The average number of casualties was 40 to 45 for each AP and APA. Of the transports in the Scoglitti operation, 11 of the 18 transports of the task unit sailed from the transport area at 2000 on D plus 2 days, with the remaining sailing on the following day. Army hospital facilities were operating ashore by that time. On arrival at Oran, all Army and Navy casualties of a serious or critical nature who could not stand the trip back to the United States were transferred to hospitals.⁸

The treatment for the wounded was effective. Excellent first-aid care was given to casualties prior to their removal to the ships. External bleeding had been controlled; pain, alleviated;

8. Ibid, pp. 1-2.

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fractures, splinted; and plasma, given as indicated. Upon receipt aboard ship, the casualties were distributed to the various battle dressing stations for treatment. Patients in severe shock were given anti-shock therapy first, before any operational procedure was begun. Definitive treatment was accorded immediately to such cases as gunshot wounds; but, generally, treatment consisted of debridement of wounds, controlling hemorrhage, dusting wounds with sulfanilimide powder, packing with vaseline gauze, and immobilization when necessary. These patients were then placed in bed and new cases were given treatment. Definitive treatment was begun after all cases had been examined. Primary closure of a few wounds and compound fractures was reported on some of the ships. Prisoners of war received the same treatment accorded to our forces. Of the wounded, 15 to 20 percent were seriously or critically wounded; about 30 percent were such as to render the men ineffective for a period of 6 to 12 months; and the remaining wounds were slight to moderately severe, with 90 days or less expectancy for recovery.⁹ A total of 531 Army casualties, 157 Navy (including USCG), and 16 prisoners of war were received by the transports of the Scoglitti area between H-hour on D-day and arrival in Oran. The dead were disposed of on the beaches of Sicily, buried at sea, or turned over to the Army in Oran, according to instructions.

9. Ibid, p. 5.

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Although naval medical facilities were not fully tested in the Sicilian operations, various observations can be made. Casualties among naval personnel amounted to 81 killed in action, 239 missing in action, and 478 wounded in action during 10 July to 17 August 1945. These figures were subject to modification, as delayed reports continued to come in from smaller ships and Army hospitals. The USS MADDOX reported 209 missing in action, all of them probably killed, as the ship was completely destroyed. Persons reported as wounded were those receiving injuries incident to actual combat. Injuries due to operational and non-combat causes outside the combat area were not included, nor were those with such medical conditions as war neurosis or combat fatigue.¹⁰

Although LST's and transports were adequate to care for most of the casualties in the Sicilian invasions, there was some opinion that if the maximum estimated casualty load had been received hospital ships would have been necessary to supplement the transports by D plus 2 and D plus 3 days. Critical medical supplies were sufficient to take care of all needs. So far as individual units were concerned, it was the opinion of the Commander of the Western Naval Task Force that beach battalions performed in a satisfactory manner, with casualties being handled efficiently and with evacuation being made to evacuation ships by

10. "Action Report, Western Naval Task Force, the Sicilian Campaign, Operation 'Husky'," p. 104.

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ambulance boats. Transports in the Gela and Scoglitti areas, remaining in those areas on D-day, D plus 1, and D plus 2 days, were not overburdened since casualties were light. In the future, LST's should have 1 medical officer, 4 hospital corpsmen, and 150 standee bunks per ship to care for lightly wounded or sick; LCI's should be used also for evacuation or ambulatory wounded and sick; hospital ships, used after the departure of transports, should be placed in a pool near the scene of action to facilitate handling requests for their use, and should be in battle areas only during daylight hours. Hospitals in Tunis-Bizerte and Oran areas handled expeditiously all casualties brought to them.¹¹

Perhaps the most exhaustive critique of medical facilities and personnel in vessels afloat is that given in the report of Admiral Kirk, Commander of the Sixth Amphibious Force, which played such an important part in the Scoglitti area of the Sicilian invasion. He summarizes:

1. The methods in use for casualty handling seemed adequate.
2. Further training of boat crews in the use of casualty handling equipment is indicated.
3. On the whole, first-aid training seemed adequate as the majority of patients received on board were in good condition.
4. The number of medical personnel in all echelons were adequate.
5. Medical personnel in transports, although very busy during and immediately following the action, could possibly have handled a

11. Ibid, pp. 102-104.

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- full capacity load of casualties.
6. Dental officers are not fully utilized in the team play.
 7. The number of hospital corps ratings was sufficient for this operation. With a capacity load of casualties, their services, of necessity, would have been more restricted.
 8. Evidence of the need for more intensive training of hospital corpsmen in transports is apparent. Every vessel carrying a medical officer should be supplied with a minimum of one operating room technician and APA's should be supplied with two. These technicians should receive their training prior to being assigned to duties afloat.
 9. Medical supplies and equipment on hand was adequate for the number of casualties received, and, in most cases, it is believed that they would have been adequate for a capacity load.
 10. Medical preparations for battle and this operation were generally excellent throughout the force.
 11. What few deficiencies were noted or complained of in the vessels afloat, could be traced to a failure on the part of the senior medical officers to comply with directives. In a few instances, lack of foresight and imagination was evidenced.¹²

In addition to ship based facilities, the Navy Medical Department, immediately after landing, set up several land based units in Sicily. One unit landed at Gela on 11 July, establishing there a small dispensary and sick bay. Another landed at Licata on 10 July, where it gave material aid to survivors. A third arrived in Licata on 19 July, after which it proceeded overland to Port Empedocle, where it established a dispensary in "Albergo

12. "Report of Medical Service in Operation 'Husky', Cent Area," pp. 9-10.

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Moderne". A fourth arrived at Palermo on 26 July, and established a dispensary at 19 Florentano Pepe, in the former home of Principessa Olga Alliate di Montereale. By 31 August all of these units had been absorbed in the one at Palermo, where a Naval Operating Base had been established. A total bed capacity of 125, with space and cots for an emergency capacity of 175, was provided.¹³

Battle Medical Experiences

The battle experience of Navy medical units in the invasion of Sicily varied according to the type of unit and the action performed. For instance, the amphibious landing craft, which were rather late innovations in warfare, occupied a major role in the invasion of Sicily. As one eyewitness stated: "The fleet of 2,000 ships (actually 3,266) that carried the allied invasion forces to Sicily was by all odds the most gigantic ever assembled in the world's history, many, many times the size of the great Spanish Armada."¹⁴ Of these, LST's, LCT's, and LCVP's performed heroic medical work, especially in evacuation phases.

LST's, for the first time in the European phase of the war, came in for a thorough testing. At Licata they furnished the principal troop lift; and, as no transports were available, they had to be used for casualty evacuation. Each ship had a small

13. "Historical Data Report, U. S. Naval Dispensary, N.O.B., Palermo, Sicily," 10 Jan. 1944, pp. 15-18.

14. E. Pyle, "The American Navy at Sicily" in Bureau of Naval Personnel Information Bulletin, No. 318, Washington, D. C., Sept. 1943, p. 35.

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compact sick bay for the routine sick and minor injuries, or occasional major surgery. The regularly assigned medical complement consisted of one pharmacist's mate first class, with a medical officer in each division of 4 to 6 ships. To bolster these facilities, a medical personnel pool of 100 naval medical officers and 400 hospital corpsmen was established at the embarkation port of Bizerte. Of these, 52 medical officers and 250 hospital corpsmen were utilized by the Navy, the remainder being detailed for duty with the Army. Each outgoing combat-loaded LST carried a medical complement of 1 officer and 5 enlisted men, including the regularly assigned pharmacist's mate. Seventy-two LST's were thus provided for all three major areas of operation (Licata, Gela, and Scoglitti), and the remaining personnel in the pool were used as a reserve for use as needed. A medical supply dump was established in connection with the personnel pool to insure a constant flow of evacuation supplies to the beaches. These supplies were furnished by medical storehouses of the Mediterranean Base Section, U. S. Army.

The Army was not pleased with the prospect of evacuating casualties in LST's. Therefore, a compromise was reached whereby evacuees were divided into two classes: (1) evacuees who could be transferred from the beaches to the Tunis-Bizerte area, and (2) non-evacuees requiring major surgery during transit. These latter were to be held over for evacuation by transports in the Gela and Scoglitti areas or by hospital ships, if necessary. Fortunately,

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there were no non-evacuables in the Licata area during the early days of operation.

The LST's were provided with cots for about 150 patients each. After the troops and equipment were landed, tank decks were made ready for the reception of casualties. Army cots were set up, and, as the patients came aboard over the ramp, they were placed in the cots and given needed care and assistance. The largest number evacuated in one ship was 118. Four hospital corpsmen and 1 medical officer were found to be sufficient to care for the casualties coming aboard. Many of the ships received less than 12 patients; and some, none. From the experiences gained, it was believed that LST's were quite suitable as evacuation ships in the Sicilian campaign--especially for short hauls of lightly wounded and sick, and where relatively few patients were concerned. Although plans had been made to install standee bunks in the after part of tank decks, thus eliminating the need for cots, this was not possible because of the lack of available material.¹⁵

Although LST's proved their suitability for evacuation purposes, certain criticisms developed as a result of the Sicilian campaign. There was considerable confusion during the early stages

15. "Action Report, Western Naval Task Force, the Sicilian Campaign, Operation 'Husky'," p. 103.

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of the operation because of the newness of this type of operation, and failure to utilize, to the fullest, hospital corpsmen and available facilities. In addition, proper definition of authority seemed to be lacking.

Other types of amphibious craft also did heroic work in the Sicilian campaign. Although plans had been made to use LCI's for the evacuation of ambulatory wounded and sick, it was not necessary to use them. Consequently no opinion developed as to their usefulness as evacuation ships. At first, LCVP's were used primarily for evacuation to larger ships. However, because of the congestion developing on the beaches, LCT's were then used to relieve the congestion. The Army found the DUKW's especially useful in evacuating the wounded from the beaches.

LCT's are worthy of further comment. Often used to evacuate wounded to larger ships, they were criticized mainly for the fact that doctors and hospital corpsmen aboard were limited to the LCT on which they were quartered, thus making it necessary for some LCT's to resort to other available medical activities. While attached to an organized shore base, the LCT was in a supplementary status. While afloat, medical supplies and facilities consisted mainly of first aid. Personnel requiring continual treatment or hospitalization were evacuated to the nearest Army or Navy medical activity. After the landing, LCT's were either tied up alongside cargo vessels or were unloading supplies on the beach.

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Thus they had little or no contact with other LCT's, and, consequently, little contact with Navy medical personnel. A flotilla of 46 LCT's, divided into 3 groups, carried a total of 3 doctors and 6 pharmacist's mates.¹⁶

Some 15 hospital ships and hospital carriers were available in the Mediterranean for use in the operation. Two of these were Army hospital ships and the remainder, British or Canadian. Although not under the cognizance of the Navy, they were to be used if necessary. The plan for their operational control by higher echelon proved to be too complicated for efficiency, and a certain amount of confusion resulted. These ships had to be used for the evacuation of casualties after the transports left the area. It became evident that too much time was required to transmit requests for their services, and as a result Army hospitals in Sicily became overloaded awaiting their appearance. Furthermore, they failed to arrive in the proper place at the desired time, or they arrived in areas where they were not needed. They also endangered other ships and installations by silhouetting them at night with their lights.

The experiences of the transports during the invasion of Sicily were many and varied. The USS NEVILLE (APA), for example, cared for 74 casualties in all, mostly of a minor nature.

16. "Report of LCT(5) Flotilla Ten, 1943", pp. 1-5.

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All casualties brought aboard testified to the excellent care they had received ashore at the hands of the medical beach party. Three battle dressing stations, with a medical officer in charge of each, were dispersed throughout the ship. One medical officer was on deck to supervise the bringing aboard of casualties and their distribution to the various dressing stations. The senior medical officer was in charge of the after sick bay, where all abdominal, chest, and head injuries were cared for. A junior medical officer in charge of the dressing station in the crew's mess hall, midship, was kept very busy caring for the minor injuries and ambulatory sick cases which were handled there. Two additional medical corpsmen and 10 hospital corpsmen had been brought aboard before the invasion, and 1 additional medical officer and 8 corpsmen comprised the medical component of the beach party. This latter group was put ashore during the landing and was not brought aboard again.¹⁷

The report of the medical officer aboard the USS LYON (APA) provides additional interesting details regarding the Sicilian operation. After all troops had been landed at Gela after 0400 on 10 July 1943, members of the Hospital Corps made ready all available berths, including the vacated troop officers' quarters adjacent to the sick bay. Plasma, dressings, and sterile instruments were placed in each room to facilitate the quick

17. "Historical Data Report, USS NEVILLE, 1943," pp. 13-14.

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handling of casualties. When casualties were brought aboard, the loading from evacuation craft to ship was accomplished by use of the Milles-Harris sling. A medical officer on the main deck gave each casualty a preliminary examination, and then directed the stretcher bearers where to take each case, depending on the seriousness of the situation. After each operation was performed, the operating room was prepared again for immediate use. Corpsmen, previously well-trained, were able to do outstanding work in the administration of plasma and oxygen and the dressing of wounds under medical supervision. Subjected to constant bombing and strafing by enemy planes, all men remained at their stations. While the ship was under way from Sicily to Algiers, no deaths occurred among the casualties. Casualties were turned over to the hospital ship, USS ARCADIA, at Algiers, for further treatment and disposition.¹⁸

An account of medical activities aboard the USS ANNE ARUNDEL (AP) illustrates also many phases of the work of the Medical Department. During the first few days off the coast of Sicily, as no casualties had been received, medical officers and corpsmen helped in the unloading of the ship. In addition, on two occasions, a medical officer accompanied by hospital corpsmen, equipped with emergency supplies, went ashore to aid and stand by

18. "Historical Data Report, Supplement to the Annual Sanitary Report, USS LYON, 1943." 10 Feb. 1944.

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during the transfer of munitions and materials from large craft. Rapid unloading of ships was necessary because of the precarious position at anchor and increasing enemy air activity. Casualties were first received on D plus 2 days and more the following day, until the entire sick bay and all the bunks of the troop officers adjacent to the sick bay were filled. The overflow was temporarily placed on cots and later in bunks on the third deck, number four hold, just below the sick bay. The majority of casualties required transfer from boat to ship by means of a hoist, although a few could walk up the companion ladder of the ship. Some were carried directly on their stretchers from an LST lying alongside, after having been transferred to the LST from a smaller craft lying aside the LST. Most of the patients were transferred to a base hospital in North Africa within a few days after their arrival aboard. Among other suggestions of the medical department of the USS ANNE ARUNDEL, it was recommended that a light fracture table be placed on large ships to enable medical officers to apply good plaster casts for injury to femurs and spines and to permit better fluoroscopic work to be done.¹⁹

Medical personnel aboard combatant ships also had their problems. Of the destroyers, the USS WOOLSEY (DD437) is an example. Among other comments of the medical officer aboard the destroyer WOOLSEY, it was pointed out that the wardroom was more

19. "Sanitary Report of the USS ANNE ARUNDEL, 1943," pp. 16-18.

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suitable for surgery than the sick bay in ships of this class-- provided necessary adjustments in the width of the wardroom mess table and improvements in lighting were made. "Because of its spaciousness," he pointed out, "complete and careful aseptic technique can be employed in the wardroom and officers can be admitted to perform duties (c.g. sponge counting, etc.)." ²⁰

At one time during the Sicily invasions, the entire medical department of the USS WOOLSEY, along with that of the USS NIBLACK, was sent to the USS BRANDT to render emergency medical aid to survivors of that ship, which had been seriously hit. Completely equipped with plasma, splints, morphine, stretchers, and other medical necessities, first aid was rendered to nearly a score of seriously wounded who were suffering from flash burns, fractures, shrapnel wounds, and internal chest injuries. The evacuation of these patients to the U. S. Naval Dispensary at Licata was effected by trucks. At the dispensary the medical departments of both ships assisted the medical staff of that installation in the definitive care of injuries. The combined efforts of shore and ship-based medical personnel resulted in the saving of many lives which might otherwise have been lost.

The log of the light carrier, USS BOISE, provides interesting details of life afloat both before and during combat.

20. "Historical Data Report, USS WOOLSEY, 1943", pp. 7-8.

An entry for 9 July, the day before the invasion, reads:

Our first casualty: a radar officer caught a finger in a watertight door as ship went to condition affirm. Everyone is joshing him about a bid for a Purple Heart.

All hands are in topnotch physical condition. Have had a brisk period of calisthenics followed by 5 minutes double time each morning for some months. It improves posture and poise, increases endurance, provides a release for pent-up emotion, and promotes sound sleep. Frequent swimming call has likewise helped immensely. The morale is superb. Sun bathing has been actively encouraged and its restful and tension-dissipating effect noted. We have no one on the binnacle or sick list. These are consistently low.²¹

Continuing for 11 July, the log reads: "LCT's are in with mobile equipment. One is loaded with ambulances. The Red Cross means kindness and comfort to those personnel. The many little kindly deeds performed by Red Cross have created deep appreciation."²²

The following statement for 12 July is recorded:

Unloading continues with ME 109's strafing the beach at intervals. All transports unloaded and shoved off late in the afternoon. Eighteen hundred wounded evacuees began arriving on barges from beach. Apparently no transports or hospital carriers remaining - wonder why? Savannah takes 50, Boise 21, including 4 German prisoners. We examined, bathed, redressed, gave plasma, applied sulfa ointment to hands and faces, fed and bunked them in short order. Remarkable how badly a man can be shot up and not receive either severe or fatal injury. One case of acute bronchitis, one of

21. "Special Medical Report, USS BOISE," 27 July 1943, p. 3.

22. Ibid, p. 5.

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acute arthritis of wrist; one 2nd and 3rd degree burns of face and hands, he received 2 plasma units ashore, we gave another plus 1,000 c.c. saline subcutaneously, and $\frac{1}{2}$ -grain morphine sulfate, others had shrapnel wounds, sprains, etc. No fractures, we X-rayed a few.

Plasma is quite the wonder treatment of the war. A patient goes sour as you watch. You are seeing him die. Beads of perspiration appear, pallor develops, the face becomes pinched, the eyes anxious, troubled, searching; the tongue dry, lips parched, pulse rapid, weak and thready, blood pressure falls, heart sounds distant. Plasma is administered and presto, in a few minutes the harbingers of death have disappeared. A runaway horse has been brought to bay. The patient recovers normally, feels quite well. It is a mistake to transport these cases unless absolutely necessary. We have noted them to go sour again incident to their transfer by stretcher. Their recovery is only temporary, superficial and evanescent. It takes time for the human organisms to reestablish firm control over the vital processes affected. Prolonged rest is just as essential for ultimate recovery as is the plasma for immediate relief.²³

Concluding with the treatment of German prisoners the log records:

They admitted having no butter in 2 years, no sugar since they could remember. They 'wolfed' what we gave them. (If their Army starves that way what must their civilians be doing?) On the whole, however, they appear quite well-nourished. One of them, an Austrian, was highly incensed when the corpsmen wrote 'German' on his sheet. He was no German. He had been wounded on the Russian front and didn't see a first-aid station for 2 months. He couldn't get over the efficiency of American care, ashore and afloat. The others expressed similar sentiments. The Army medics on the beach have done a wonderful job of treatment on these casualties. Plasma, morphine sulfate, sulfa powder

23. Ibid, p. 7.

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locally, bandaging, tagging, left nothing to be desired. They must be efficient, hard working and well-trained men. A 'well done' to them.²⁴

The report of the USS BROOKLYN, which also took part in the invasions, further illustrates the medical activity on this type of larger combatant ship. During the Sicilian operation, the ship was almost constantly at general quarters for five days, during which time bombing attacks, extensive shore bombardment, and mine explosions were experienced. The crew and officers suffered extensive fatigue from excitement and prolonged duty, but all showed the highest type of courage and valor. Not a single case of the so-called war neurosis was experienced. Casualties were few and minor. Commenting on the medical features of the operation, it was pointed out that: "The improved technique of treating top-side injuries while battle is going on, either in the Admiral's cabin or in the Chief's quarters aft, is probably the greatest benefit in keeping up the morale of the men and officers. The immediate treatment gives the man an added reassurance that nothing is seriously wrong or if he has a serious injury it will be cared for at once."²⁵

Land based units of the Navy Medical Department also saw action. For instance, the various units, (later combined into one

24. Ibid, p. 8.

25. "Historical Data for 1943, USS BROOKLYN," 5 Jan. 1944, pp. 1-2.

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at the N.O.B., Palermo), were praised for their work during battle. Unit IV, landing at Licata under fire, performed gallantly on 11 July, when it treated and evacuated the injured from LST 158; on 10 August survivors of the USS BRANDT were treated. Unit II suffered air raids and strafing while at Gela; and heavy duty was required there in the identification and burial of the dead, many of whom were Army paratroopers. Unit I was subjected to raids in Palermo on 2 and 4 August, and, although the wounded were hospitalized in Army hospitals, much extra duty and exposure to danger resulted. By 19 August, Navy personnel were transferred to the hospital facilities of this last unit. On 23 August following an air raid the unit was called upon to care for 65 casualties from ships in Palermo Harbor, namely from the SC 694, SC 696, the USS NARAGANSAT, the SS WILLIAM H. SEWARD, and LCT 224.²⁶

In closing, a summary of work done by land based hospital facilities is in order. Generally, transports evacuated the wounded to Oran, and LST's, hospital ships and hospital carriers evacuated theirs to the Tunis-Bizerte area. Each ship prepared lists of wounded giving the name, rank or rate, service number, organization, date wounded, date received aboard and transferred, and condition on transfer. Copies of these reports were furnished to the senior Army and Navy officer present in the port to which

26. "Historical Data Report, N.O.B., Palermo, Sicily", p. 20.

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the casualties were evacuated. No "lost" cases were reported. Army patients were evacuated to Army hospitals. Naval patients were sorted—those that could be treated in naval dispensaries were handled there; the remainder went to Army hospitals. One group of transports was destined to go to the United States. Patients aboard these vessels were also divided into two groups—(1) those having hospital expectancy of less than 90 days, and (2) those who were not believed to be able to stand the voyage. The latter group was then transferred ashore. Those whose hospital expectancy was more than 90 days and those attached to Army and Navy units temporarily assigned to the theatre of operations were returned to the United States. Reports indicated that patients received excellent care in the hospitals ashore. Adequate facilities, ample medical personnel, and prompt treatment combined to keep casualties and sickness to a minimum.²⁷

27. "Action Report, Western Naval Task Force, the Sicilian Campaign, Operation 'Husky'," p. 104.

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CHAPTER XVI

SALERNO

Summary

The Allies were ready to carry the attack to Italy proper, following the conquest of Sicily. Beginning on 3 September 1943 the initial assault was made across the Straits of Messina. A second landing on the Italian heel at Taranto was made on 10 September. A third, at Salerno, destined to be the main effort, was begun on 9 September. This phase of the Italian campaign was brought to a successful conclusion with the Allied entry into Naples on 1 October, but the cost in manpower had been heavy. Casualties were heavier than in either the North African or Sicilian landings.

In general the U. S. Navy Medical Department followed the plans which had been formulated for the Sicilian invasion. Based upon its primary functions of providing medical care for the personnel of all services while aboard U. S. Navy ships, and of evacuating casualties from the beaches during the early phases of the operation, the medical plans for the most part were carried through with dispatch. The responsibility for medical services for all Army personnel aboard Navy ships was the Navy's, although the Army cooperated - both services working together for the advantage of both. Preoperational training was provided, and first-aid training for landing boat crews was con-

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tinued. The evacuation organization consisting of medical sections of beach parties, ambulance boats, evacuation ships, and hospital facilities on friendly shores was continued.

The medical sections of the Navy beach parties performed their work in a praiseworthy manner under difficult and arduous circumstances. It became necessary to evacuate casualties under prolonged fire because of the delay in stabilizing beachheads. Casualties from the northern beaches, where the British operated, were evacuated directly to British hospital ships beginning at noon on D-day, British transports not having the hospital facilities of American APA's. Casualties from the southern beaches were evacuated to transports while they remained in the area, and, thereafter, to hospital ships.

Some confusion and unnecessary movement of patients occurred following the departure of the transports during the late afternoon of D plus 1 day. This was caused by the unfamiliarity of beach battalion personnel with the plan providing for the hospital ships to arrive in the area at sunrise and to depart at sunset, beginning with D plus 2 days. On the nights of D plus 1 and D plus 2, casualties were evacuated to the USS BISCAYNE (AVP11) and other ships in the area. These ships, having inadequate medical facilities and personnel, were able to provide shelter for the time being only. Patients had to be transferred to

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hospital ships on the following day. During this transitional period between the departure of the transports and the arrival of the hospital ships, and during the nights, casualties were provided for as well as the difficult conditions of the landings permitted.

Beach parties in general were criticized. There was a definite need for better training and understanding of the respective responsibilities of the medical sections of the Army and Navy beach parties. Unnecessary delays in transporting casualties to beach evacuation stations developed repeatedly, and, at times, it was necessary to send Navy personnel inland from their stations to handle Army casualties and to bring them to the evacuation stations. This was not a Navy responsibility, and the need for correction in future operations was recognized. If the Navy was to assume this responsibility, it was believed that additional personnel, equipment, and transportation facilities would have to be provided.

Little criticism developed as a result of the work of the ambulance boats. As in the Sicilian landings, the practice of making available all landing boats to evacuate casualties was followed. Boat crews were adequately trained in first-aid procedures and in the handling of ambulatory and non-ambulatory cases.

Transports remained in the area on D-day and D plus 1 day. During this period 513 casualties were received aboard, including 386 U. S. Army, 106 U. S. Navy, and 21 British Army and prisoner of war

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casualties. A total of 42 deaths, 16 U. S. Army and 26 U. S. Navy, occurred among this number. The smooth and efficient manner of handling patients, as experienced in the Sicilian operations, was continued, and minor deficiencies were remedied. Casualties were taken aboard by hoisting boats to the rail or by hoisting patients, in groups or individually, from boats alongside.

LST's, used in both the northern and southern areas, had different problems in each case. The assault and build-up forces in the southern area were American, while in the northern area the troops were British and the ships both British and American. Approximately six times as many LST's participated in the northern area as in the southern. Besides the fact that British transports were not equipped to handle casualties, the British refused to accept LST's as evacuation ships, and they relied solely on hospital ships. Although the U. S. Army was willing to use the LST's as evacuation ships, this was not generally necessary because better evacuation facilities were provided by the U. S. transports and later by hospital ships.

Despite the fact that the British refused to accept LST's as evacuation ships, every U. S. Navy LST was manned and equipped to evacuate casualties if the need arose. Each ship carried a medical complement of one medical officer and three pharmacist's mates, and was supplied with 75 litters, 60 cots, and 150 blankets. Cots were placed aboard, in the event that litters were required without exchange

by the beach battalions. Each ship was supplied with 36 units of plasma, 8 units of saline-glucose and 8 units of saline. Sulphonamide drugs and tetanus toxoid were supplied in liberal quantities, and smaller quantities of tetanus antitoxin were aboard for casualties whose primary toxoid was unknown or uncertain.

The medical precautions taken paid dividends. The USS LST 351 received 28 severely burned casualties from the USS NAUSET, all of whom were treated and survived. Four hundred twenty-eight, mostly sick and less severely wounded, were later evacuated from the northern area by LST's. In general, LST's again proved their feasibility in the evacuation of the sick and less severely wounded where the hauls were relatively short and where major definitive treatment was not immediately required.

As a result of experience gained in the Sicilian operations with respect to the use of hospital ships, certain changes concerning their use were inaugurated. All hospital ships, regardless of nationality, were placed under the operational control of Allied Force Headquarters. Operating on a pre-arranged schedule during the crucial period of D-day to D plus 5 days, the arrivals and departures of these ships in the battle zone coincided with sunrise and sunset respectively.

Additional hospital ships were kept in reserve at Palermo, and, beginning with D plus 5 days, they were dispatched to the combat area as needed by AFHQ, upon receipt of requests from the Commanding General Fifth Army. They were then sent to the ports best able to

handle them. One hospital ship, HMS NEWFOUNDLAND, was lost as a result of enemy action.

Hospital facilities on friendly shores were extensively used for the evacuation of the wounded. Transports evacuated their casualties to Oran; U. S. Navy LST's evacuated to Palermo and Bizerte; while hospital ships evacuated patients to various ports, including Oran, Algiers, Bone, Phillipeville, Bizerte, Tunis, Tripoli, Augusta, and Catania. Each evacuating ship supplied competent authority with comprehensive lists of all wounded aboard; and no "lost" cases were reported. Total U. S. Navy casualties in the Salerno operations up to 31 December 1943 were 296 killed, 557 missing, and 422 wounded in action. The majority of those missing were eventually classified as killed, because they were mostly those aboard ships that had been lost in enemy action. None of the casualties included were those who had been injured out of combat. Dead ashore were buried by the Graves Registration Section of the U. S. Army. Afloat, the dead were buried at sea, unless the ships were due to arrive in port soon, in which event the dead were transferred ashore for burial.¹

Critique

Although LST's had definitely proved their usefulness in

1. "The Italian Campaign, Western Naval Task Force, Action Report of the Salerno Landings, September - October, 1943," pp. 213-216. This report, presented by Adm. H. K. Hewitt on 11 Jan. 1945, gives an excellent summary of the Salerno operations.

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amphibious warfare, especially in the evacuation of wounded, they had their difficulties in the Salerno landings - as, indeed, they had in the Sicilian. Some confusion developed, largely from a failure to utilize fully available Hospital Corps personnel and medical facilities. Part of this was caused by an improper definition of authority. One medical officer suggested the following procedure to relieve this situation:

Knowing that the greatest number of casualties will occur during the earliest stages of any successful invasion, it is my feeling that the greatest amount of medical coverage should be provided at that time. This would require a redistribution of hospital corpsmen and material in almost all loading barges in the earlier waves. Because of the accuracy in the future for the smaller craft to reach their designated beaches, it should be possible to anticipate a consolidation of medical activity at specific areas along the entire beachhead. This would provide the widest possible coverage for immediate care to the wounded. Therefore, doctors in the initial parties should not have too great difficulty in gathering their groups of corpsmen and material and officially directing the activity once the beaches are reached. Hence, multiple first-aid centers can be made immediately available for the care of the wounded and potentially wounded effectives reinstated without too much loss of time. The more seriously wounded can be given immediate first-aid attention and after contact is made with the senior beach medical officer, evacuation can be started seaward. Each craft returning with wounded should have accompanying hospital corpsmen aboard to provide care for the casualties on the long journey back to the available transport. This, I believe, did not occur previously.

With the passage of time these exceedingly temporary aid centers can be consolidated into larger areas close to beach strips designated as LST landing beaches, so that their activities can more uniformly be controlled as regards evacuation by the senior beach party medical officer. Thus evacuees are made available for loading aboard LST's without too much time lost for the LST to retract from the beach.

2. Letter of 13 Mar. 1944 from A. A. Abrams, Lieutenant, (MC)V(S), USNR, to Adm. R. T. McIntire, (MC), USN.

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Further recommendations stressed the inadvisability of loading LST's used as hospital vessels with stores or ammunition not in vehicles, because it delayed, unduly, the taking of casualties aboard. Furthermore, as had been true earlier in July, it was unsafe to take time out to unload on the beaches because of enemy resistance. Retracting from the beaches immediately after the motorized equipment went ashore, it was customary for LST's to drop anchor several miles off shore, where they often had to wait several days for smaller craft to appear to finish the unloading. It was also recommended that LST's designated as short haul hospital units be so marked that they could be easily recognized in order to facilitate the evacuation of the wounded; that working parties be aboard to clean the ships immediately after the departure of the vehicles and prior to the arrival of casualties aboard; that at least one surgically trained physician be aboard LST's used for short haul hospital ships; that these ships be given priority to leave the combat zone and be unloaded as soon as possible; that other LST's be provided with additional medical stores and hospital corpsmen in case they should be called on to evacuate casualties; and that senior beach medical officers have senior rank so that their authority could go unhampered in relation to the Army, the beachmaster, and ships afloat. In this latter instance, it was suggested that the authority of the senior beach medical officer should be absolute until the Army was well entrenched and its own hospital facilities set up near the front.³

3. Ibid.

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It was pointed out furthermore that:

The keynote of the medical component in all future operations must be the prompt evacuation of the more seriously wounded, superseded only by the caring for the potential effectives. Too, the medical components attached to this activity, which, by its very nature, is hazardous under highly irregular conditions at best, should be indoctrinated with the thought of giving a minimum of medical care consistent with the best possible welfare of the casualties and to route them to more clearly defined areas set up for definitive treatment as quickly as resources are available. Authority of the beach doctor, adequate communication and cooperation will help to avoid future confusion.⁴

Probably the most exhaustive critique of the medical aspects of the Salerno operation was that of the Commander of Task Force Eighty-one, covering the operational aspects of the Lighth Amphibious Force. In discussing supplies, the dissemination of the medical plan to medical officers, beach battalions, transport medical officers, the evacuation of wounded after the departure of transports, evacuation from transports to Army hospitals, and in the estimate of medical adequacy, this report emphasized deficiencies as well as good points. Summarizing these phases, it was found that the following applied:

1. Supplies

- a. Some difficulty was experienced before the operation in securing extra equipment and materials, particularly stretchers. This required a tedious search and delivery of only a few at a time because of the varied movement of ships.

4. Ibid.

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- b. The remoteness of the medical storehouse at Casablanca and the varied movement of ships made supply so uncertain that barter with the Army and other ships was the most feasible method of securing supplies. Fortunately, an excess of supplies at Arzeu was sufficient to meet immediate needs in some instances.
2. Dissemination of Medical Plan to Medical Officers
 - a. Commanding officers in some instances failed to show the medical plan to medical officers, which left them ignorant of the plan to be followed. Medical reports were not always received after the operation, and often those received showed an entire lack of familiarity with the annex covering reports.
 - b. A comprehensive casualty report for the task force could be formulated only if prescribed forms were followed.
3. Beach Battalion
 - a. There was marked congestion on the beaches, with the medical beach party in some instances being set up close to the main road, and too near the unloading areas to allow for discriminate bombing. The only marking, a vertical red cross facing the sea, was not discernible from the air. San bag splinter protections were low and the area shelter was small, allowing for the care of not more than 3 patients.
 - b. It was believed that if the canvas cover on which a red

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cross had been painted had been promptly spread on the ground near the shelter, even if not used to cover the shelter, it would have made the medical station more readily discernible from the air.

- c. Medical stations should have been situated at a greater distance from the unloading areas, preferably not too near traffic areas which might draw aerial attacks. .
- d. Sandbag splinter protections should have been more substantial and high enough to protect a man seated on the ground. These protection areas should have been large enough to enclose 20 patients and all medical personnel. Multiple small enclosures were found to be preferable to larger single barriers.
- e. The work of the beach medical officers was carried on with a high degree of skill and courage. Prompt treatment of patients was accorded, including some civilians.
- f. It was felt that civilians should have been treated ashore and not aboard ship, as happened in a few instances.

4. Transport Medical Officers

- a. Medical officers were thoroughly indoctrinated in Army medical procedure, thus allowing for adequate cooperation, Army surgeons found Navy treatment of patients more in line with theirs than was experienced in previous opera-

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tions. For the most part, transport medical officers worked with smooth efficiency as a result of experience in earlier operations.

5. Evacuation of Wounded after Departure of Transports

- a. Transports having departed under heavy aerial attacks prior to the arrival of hospital ships, grave concern was felt for some of the patients ashore, especially during the night.
- b. Some patients remained in sand bag shelters ashore, although several were sent to ships not equipped for their care.
- c. The evacuation of patients to any ship available was not always believed to be desirable.
- d. Evacuation of patients from shore to ship, between the departure of transports and the arrival of hospital ships was believed to be undesirable. It was felt that in future operations beach medical officers would have to accept this situation and prepare to care for patients until proper evacuation could be made or until Army facilities became adequate.
- e. On a small ship with limited personnel and equipment no better care could be given than that which could be provided on the beach.

6. Evacuation from Transports to Army Hospitals

- a. Some difficulty was experienced in transferring patients

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from transports to Army ambulances ashore in Oran.

- b. Radio silence prohibited the making of early arrangements for ambulances. Standby orders for ships, being limited to two hours, necessitated a quick transfer of patients.
- c. The Army's demand for previous casualty information was not feasible. An exact report on the number of ambulatory and stretcher cases was useless, as all patients were collected en masse on the quay.
- d. It was announced that in the future, the exact number of ambulatory and stretcher cases should be ascertained just prior to arrival, and a report transmitted by visual means ashore on the earliest contact with the shore station.
- e. Recommendations were made that more Red Cross nurses should be present on the dock. At least 12 could have been used to receive patients, inasmuch as hospital corpsmen were usually busy with physical labors, and the nurses could serve to bolster morale of patients encountering new surroundings and service.

7. Estimate of Medical Adequacy

Due to the small number of casualties, medical personnel, supplies, and equipment of transports were ample in this operation, as in previous operations. Three times the number of casualties could have been handled, even if many of them had been severe. Had the casualties exceeded this figure, hospital ships would have been required on D plus 1 day to supplement transports.⁵

5. "Eighth Amphibious Force, Operation Avalanche, Action Report Medical", pp. 5-8.

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B I B L I O G R A P H Y

Abrams, A. A., Lieutenant, (MC), V(S), USNR, to Vice Adm. R. T. McIntire, (MC), USN, 13 March 1944.

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CHAPTER XVII

NORMANDY

Preparations

The invasion of Normandy on 6 June 1944 heralded the beginning of the largest amphibious landings in history. Using over 4,000 ships, these operations were designed to drive German arms from the Cherbourg sector on the northern French coast. Within a month after the initial landings the outcome was clear. The Allies had been successful in their landings, and the Germans were retreating in much the same manner as others had retreated before them during the earlier years of the war. The many months of planning, preparation, and training prior to the invasion had begun to pay dividends.

The story of the Navy Medical Department was principally one of planning for and participating in the assault on the Normandy beachheads. Medical services of the United States Navy were designed to support the operation. The primary responsibility, following the pattern of preceding invasions, was: (a) medical service to all attached and embarked personnel between the ports of embarkation and the assault beaches; (b) seaward evacuation and hospitalization afloat within the combat zone; and (c) medical service while operating jointly with the ground forces, to all personnel in the beach areas. To fulfill this mission, it was necessary to plan, prepare, organize, train, supply, and equip the medical elements of the force for the task. The final

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medical plan was a natural culmination of this preoperational preparation.¹

Arriving in the European theatre of operations in November 1943, the staff medical officer of the Western Naval Task Force began preparations for the coming invasion. From experiences derived in earlier operations, plans were drawn up, including tables specifying responsibilities as between the Army and Navy, estimates of casualties, casualty evacuation and recording plans, and materiel and personnel plans. Various facilities, including LST's, hospital ships, transports, sea rescue craft, air evacuation by the Army, and advanced amphibious bases, were planned for use. Medical personnel were augmented and given additional training.

The final Navy medical plan, following generally those formulated in earlier operations, was concerned with three main phases -- the far-shore, afloat, and the near-shore. The far-shore phase on the coast of Normandy was concerned largely with the prompt exchange of medical supplies and equipment and the evacuation from the shore to ships of casualties. Afloat, medical care was to be given to casualties according to their needs and the medical facilities available. The near-shore phase was concerned with the Navy's responsibility for the delivery of casualties to the Army at near-shore ports or hards in the United Kingdom.

1. G. B. Dowling, Captain, (MC), USN, Special Report to the Chief of the Bureau of Medicine and Surgery, U. S. Navy, of United States Naval Medical Service in the Invasion of Normandy, 6 June 1944, pp. 3-14, gives a thorough survey of preparatory phases.

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The principal task of the Navy Medical Department was that of shore to shore evacuation. Initially, there was to be a total evacuation of ineffectives except non-transportables, while later a 7, 15, 30-day, and longer policy of holding casualties ashore was to be followed, as directed by the Army. In the shore to ship phase on the far shore any boats used in amphibious operations were to be used in evacuating casualties from the beach. LST's were to provide the main casualty lift for shore to shore evacuation. LCI's were to carry ambulatory cases; transports were to provide casualty lifts as the military situation permitted; hospital carriers were to be available after D plus 1 day; and hospital ships were to be used for evacuation from major ports to the United States. Estimates provided for .17 of 1 percent sick and non-battle casualties, and 5 to 8 percent for the Army and 4 to 8 percent for Navy casualties. If chemical agents were resorted to by the enemy, casualty percentages would be higher. Complete reporting of casualties on arrival at the near shore was to be provided by signal, voice, dispatch, and hand.

The Navy being committed to cross-channel evacuation of all casualties, it was anticipated that LST's would comprise the main casualty lift. Because of the uncertainty as to beach characteristics, underwater obstacles, and mines, it was believed that LST's would be unable to beach in the early stages for the purpose of embarking casualties. Tests were conducted, therefore, to devise methods for embarkation over the side of the ship while unloading operations were in progress. In February and March 1944 the medical personnel designated for use aboard the LST's began arriving in the United Kingdom.

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Special training courses were inaugurated for these personnel, and in April practical demonstrations in casualty handling were held at Fowey, Cornwall. The final distribution of medical personnel to LST's included 90 LST's with 3 medical officers and 20 hospital corpsmen each; 13 LST's with 2 medical officers and 20 corpsmen; and 3 LST's with 1 medical officer and 20 corpsmen. Army surgeons and medical personnel were added in some instances. Each of these LST's was equipped with medical supplies and equipment to provide surgical and nursing care for 200 patients on the return to the United Kingdom. Medical Supply dumps were established at Southampton, Portland-Weymouth, and Brixham for the resupply of medical materials.²

In general, preparations for the Normandy landings were a refinement of those formulated for the North African and Italian invasions. The lessons learned at Sicily, especially, were drawn upon in preparation for Normandy. The anticipated reliance on LST's as casualty evacuation ships in the Normandy operation was the direct outgrowth of the lessons learned at Sicily, where the LST's had demonstrated their practicability for the evacuation of casualties in short haul operations. That the faith placed in their selection as casualty evacuation ships for the Normandy operation was not misplaced

2. "Medical Preparation and Casualty Handling, Operation Overload," from the Staff Medical Officer to P. E. Howard, Commander, USN, pp. 1-3.

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was to be proved in the landings of 6 June and thereafter.

The Normandy Beachheads

The Normandy landings, so far as the American forces were concerned, were concentrated in the Bay of the Seine on two main areas designated as Omaha Beach and Utah Beach. Navy medical personnel landed on these beaches as early as H plus 40 minutes. The military situation at Omaha Beach was such as to limit operations to primary first aid until late on D-day, while on Utah Beach initial casualties were relatively light, allowing for the establishment of a general medical organization.

The Navy medical organizations assigned to Omaha Beach were the medical sections of the 6th and 7th Beach Battalions. During the initial assault, severe enemy opposition resulted in the loss of a large part of the medical supplies brought to the beach by craft and DUKW's, as well as that which was hand-carried by personnel. Fortunately, medical supplies from other sources proved to be adequate, except for litters, the need of which became acute. At first, it was possible to give only first-aid treatment, owing to the tactical situation on the beach and the necessity of keeping the beach cleared of casualties.

Casualties on D-day at Omaha Beach were placed on any available craft and dispatched primarily to LST's and APA's. It was impossible to keep a record of casualties during the early stages of

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the assault. A time lag occurred on D-day, when casualties were not cleared from the beach for a period of from 4 to 8 hours. This was caused by the confusion and by the demands of military action which did not leave any small craft for evacuating the wounded. By D plus 1 day, however, the medical sections of the two beach battalions were established on their designated beaches, and medical supplies, including litters, were being sent ashore in sufficient numbers to meet the demand. Casualties were being evacuated over definite assigned areas, records were being kept, and the chain of evacuation from shore to sea was functioning according to plan. As the beach-head progressed, the Army far-shore medical battalions became established about one-half mile inland from the high-water mark. Casualties were evacuated by three main routes to the beach, where the Navy had established three evacuation stations.

Army transport planes began evacuation of patients by air from Omaha beach on D plus 4 days- 10 days ahead of schedule. According to plan, however, the major portion of casualties was at first evacuated to any LST available. This slowed down reloading operations on the return to the United Kingdom, so certain LST's were designated as evacuation ships. British hospital ships were used to some extent, but difficulty was experienced in transferring patients to them. By D plus 10 days there was little need for hospital ships, and LST's along with air transports proved adequate. During a storm from D plus 13 to D plus 16 days, it was impossible to evacuate patients by sea, and air transports succeeded in evacuating some 1,890 cases. By D plus 17 days air evacuation was of the utmost importance and sea

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evacuation was held in a stand-by status, being used mainly for ambulatory cases. By D plus 13 days one axis of casualty evacuation had become established, where patients were sorted according to types of wounds. Direct telephone communications were set up to the Navy beach evacuation station, from which the evacuation control center could be notified when a LST became available. This line was also available to the air evacuation center. The over-all result was greater efficiency and speed in handling cases and maintenance of records.

The general concept of casualty evacuation was carried out at Omaha Beach essentially as planned. With the exception of a few hours on D-day, there was little delay in evacuating casualties. The changing normal back-drift of casualties and route of casualty flow was met by the elasticity and mobility of evacuation station organization. The cooperation between the medical units of the Army and Navy was of the highest. By D plus 17 days the assault phase was considered to be over, and the casualty-evacuation system had become well regulated. The medical personnel of the far-shore party organization gradually took over the routine of dispatching casualties, and the Navy beach battalion medical sections were returned to bases in England by D plus 24 days. During the period covered, the percentage of casualties was 27 percent (2 medical officers and 20 hospital corpsmen) for the 6th Beach Battalion medical sections, and 13 percent (1 medical officer and 10 hospital corpsmen) for the 7th Beach

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Battalion medical sections.

Navy medical service on Utah Beach consisted of the medical sections of the 2nd Beach Battalion. Landing at about H plus 1 hour with the assault waves, the medical services were functioning well by H plus 2 hours. Organized after the initial phase under the senior medical officer acting as general supervisor, two medical officers were assigned to the 261st Medical Battalion of the Army as Navy liaison officers; two medical officers established and operated first-aid stations about 1,000 feet apart on the main beach, and two medical officers served as evacuation officers on the beach proper. Hospital corpsmen were allotted to the individual medical officers as needed by individual requirements. Casualties among the 2nd Beach Battalion medical sections were relatively light, with 1 officer and 7 men killed and 12 men evacuated because of wounds.

A portion of the medical supplies was lost at Utah Beach in the early stages because of enemy action, but needs were adequately met from beach bags (medical resupply units). Later needs were met by generous supplies from the ships, and from the pool maintained by the 261st Medical Battalion of the Army. With the exception of the first few hours, no particular shortages developed. One-fourth ton trucks supplied to the medical officers of the 2nd

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Beach Battalion proved invaluable in transporting supplies, as did jeeps. Communication needs were met by radio sets providing contact with dispersed medical activities, with signals being transmitted every 15 minutes. Clearing companies were located 500 yards inland from the beach, but by use of hand radio sets close and efficient contact was maintained between the various medical units.

During the early hours of D-day on Utah Beach all possible means of seaward evacuation were used, including DUKW's, LCVP's, and LCT's. Jeeps fitted to carry litters were used to transport patients to evacuation craft, with as many as 200 casualties per hour being loaded in this way. Most of the casualties were transferred off-shore to LST's, although in some instances patients were conveyed to hospital carriers and other ships, particularly during the early hours when LST's could not beach. At times it was necessary to transfer casualties from DUKW's to LCT's while afloat. Hospital carriers proved to be unsatisfactory, largely because they had to anchor far from the shore, which necessitated additional handling of patients. The Navy organization for evacuating casualties from Utah Beach was well organized, and a minimum of divided responsibility was encountered. On D plus 29 days, the 2nd Beach Battalion was relieved of the duties of casualty evacuation, and a medical officer of the staff of the NOIC Utah was charged with the responsibility of evacuating casualties.

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Far-shore medical units were well supplied with emergency materiel from stocks maintained in vessels of the naval force - mainly LST's. Although some was lost during the early landings, beach bags of the medical resupply unit were sufficient to fill the gap until Army medical resupply dumps were established ashore. Localized shortages did exist or became imminent in some instances. Part of this was due to the fact that LST's could not beach in the early assault phases, and Army unloading details did not like to accept the exchange units as part of the cargos to be unloaded. Later, when LST's beached, this difficulty was not experienced. Among the items furnished to shore medical units by Navy vessels were litters, blankets, whole blood plasma, and beach bags.

Operations Afloat

Afloat, staff medical officers in key command echelons were located on the USS AUGUSTA, USS ANCON, USS BAYFIELD, and in the Shuttle Control Headquarters Ship. During the approach to Normandy, very few personnel casualties were experienced in the assault force. Those which occurred were largely air-borne and air-force personnel. Sea rescue work was efficiently effected by Coast Guard-manned sea rescue craft. Casualties from enemy action were handled in some instances until sorting was completed. Evacuation to England was accomplished primarily on LST's, with lesser numbers being carried by transports and hospital carriers.

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The fundamental task of the medical service afloat was that of cross-channel evacuation to England. On D-day the 103 LST's assigned to the Western Naval Task Force performed as anticipated. Fifty-four of these had been converted for casualty handling. The remaining 49 were implemented with additional medical personnel and supplies. The original idea of using all LST's for evacuation of casualties proved unsound, because of the loss of time required to unload patients from LST's needed for carrying additional military material across to Normandy. Consequently, as evacuation became better organized, only designated LST's were assigned the evacuation task.

The first casualties were received afloat by H plus 2 hours. At H plus 6 to H plus 8 hours the seaward evacuation organization had begun to function. In the Utah section early beaching of LST's facilitated evacuation, while in the Omaha sector evacuation was delayed by beach obstacles and enemy resistance. The actual drying-out of LST's was possible in the Utah area, which materially facilitated casualty loading. Drying-out LST's was not expedient at first in the Omaha area, however, thus necessitating the use of specially developed handling equipment and technique. While not having specific responsibilities for evacuation, certain ships, particularly the USS BAYFIELD and the USS ACHENAR, rendered invaluable service in receiving and caring for casualties until they could be transferred to

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LST's and hospital carriers. Of the 5 British hospital ships, 4 were available for receiving casualties from D plus 1 day onward, 1 having been damaged by a mine while proceeding on its way to the assault area.

Near-shore Operations in England

Near-shore medical facilities were adequate to accomplish the task of receiving casualties brought from the far-shore. Beginning with the arrival of a few casualties at Portland, England, on D-day, and at Southampton on D plus 2, the heaviest loads for both ports occurred on D plus 3 and D plus 4 days. Lesser numbers were received at Plymouth and Falmouth. These were casualties from the initial landings. Most of the wounded arrived in England in good condition, having received first aid on the far shore and additional treatment during the cross-channel trip. Life-saving surgery had been resorted to when necessary, and non-transportables had been detained at holding units. Naval casualties were sent ashore to Naval Base Hospital No. 12 when possible.

The near-shore medical facilities functioned satisfactorily for the most part. One exception occurred at Portland from D plus 4 to D plus 7 days, when 3 convoys of 67 LST's awaited unloading facilities. Operational units responsible for the Military success

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of the Normandy landings insisted on the priority of loading, regardless of casualties. Because of this congestion, the LST's were retained outside the breakwater, which necessitated unloading of casualties to LCT's, from which they were unloaded onto LCT hards made available for this service. In one period of 3 hours, 1,100 patients were unloaded by this means. Approximately 12,834 patients were unloaded at Portland by D plus 22 days, and 6,065 at Southampton.

Running records of battle casualties were efficiently recorded, with information being supplied to the central recording section within a few hours after debarkation in the near-shore ports. By 5 July (D plus 29 days), 23,377 casualties had been reported to the Service Force Casualty Section; 22,455 casualties were known to have debarked in England. A break-down of the 23,377 casualties included: U. S. Navy, 2,078; U. S. Coast Guard, 76; U. S. Army, 17,247; Allies, 1,298; and POW, 2,678.³

During the first 11 days certain additional statistics were available, which, though not conclusive, give a general picture. The ratio of Army to Navy wounded analyzed was approximately 11 to 1. The Navy received slightly more wounds per man, and of the Navy wounded, a higher percentage was severe. Burns and blast injuries, wounds of head, face, and neck, and simple fractures were higher among Navy

3. G. B. Dowling, United States Medical Service in the Invasion of Normandy, pp. 15-20.

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personnel. Extremity wounds in the Army were 13 percent higher than in the Navy. Injuries of the extremities, due to accident, were approximately 4 times as high in the Army as compared to the Navy. The percentage of chest wounds among Army personnel was nearly twice that of the Navy. Casualties caused by disease among Army personnel approximately doubled that of the Navy.

Casualty evacuation statistics through D plus 11 days are interesting, especially as they show the predominant part played by LST's. Of the 106 LST's in the Western Naval Task Force, 95 carried casualties on one or more return trips from the far-shore; 49 of these made 1 trip, 41 made 2 trips, 4 made 3 trips, and 1 made 4 trips. An average of 70.24 casualties per LST were carried on the first trip, 106.56 average on the second trip, and 76 average on the third trip. Only 1 LST carrying 179 casualties made a fourth trip. The average per LST for the period was 78.4 casualties, with the greatest single load recorded being 331. Two loads of over 300 casualties were carried; 16 loads of over 200; 288, over 100; and 101, of less than 100. Of the transports in the operation, 2 made 2 evacuations to the near-shore, 6 made 1, and 2 made none. The total number of casualties evacuated by transports was 560, the average being 56 per load. One hospital carrier completed 1 evacuation, 2 completed 2, 1 completed 3, and 1 made none. The total evacuated by hospital carriers was 2,272 - the average load being 284 and the largest single load, 643. LCI's returned 6 casualties to the near-shore. Summarized percentages

were: LST's - 79.63 percent, transports - 3.86 percent, hospital carriers - 16.46 percent, and LCI's - 0.04 percent.⁴

Medical material proved sufficient to meet the demands of the near-shore. Use of reserve materials was not required, as no loss on the near-shore was experienced as a result of enemy action. The use of air transportation to evacuate casualties from the assault area 10 days ahead of schedule also helped to reduce the amount of medical material required by ground and naval forces concerned with the evacuation of casualties. LST's usually received medical supplies on board in less than 30 minutes after docking at the port loading point. A need for a few supplies not provided in the planned supply list developed as the assault progressed. Direct shipment of these items was accomplished by special truck from Exeter or from Army supply depots direct to port issue points.⁵

The following casualty figures, based on data available on D plus 114 days, further emphasize the importance of LST's in cross-channel evacuation. Casualties for all services included: U. S. Navy, 2,433 (363 dead and 2,070 wounded); U. S. Coast Guard, 117 (25 dead and 92 wounded); U. S. Army, 41,147 (124 dead and 41,023 wounded); Allies, 1,899 (5 dead and 1,894 wounded); and prisoners of war (POW's), 9,101 (4 dead and 9,097 wounded). Of these, LST's carried a total of

4. Ibid., Appendix N, pp. N7-N10.

5. Ibid., pp. 20-21.

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41,035, the average casualty lift being 123. The maximum lift was 425 casualties, and the minimum lift was 1.⁶

Battle Medical Experiences

The experiences of U. S. naval medical units at Normandy were not radically different from those of earlier invasions. There were, however, a few incidents which emphasized the scope of operations and the types of treatment given.

One of the medical incidents worthy of comment was the sinking of the transport, USS SUSAN B. ANTHONY. Proceeding in convoy on 7 June to Omaha Beach, this vessel experienced a violent explosion at 0757, just prior to her estimated arrival time at 0800. According to survivors, "The ship lifted and hogged, and then settled and sagged." A high column of water was noted abreast of Number 4 hatch. All power, including the emergency power, was lost as a result of the explosion, and the steering gear was useless. The rudder indicator went to hard left and remained there, while the ship veered to the left losing way. The international signal, "not under command", was hoisted, as was the Morsig signal, "I have been mined." The whistle and the siren were inoperative. A list to the starboard was temporarily corrected by shifting troops to the port side. Numerous vessels, including the USS PINTO, 2 LCT's, and 1 LCI, and 2 British escort vessels, proceeded to her aid. By 0830 the commanding officer ordered

6. "Medical Preparation and Casualty Handling, Operation Overlord", pp. 3-4.

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the senior medical officer to prepare to evacuate casualties, and the troops were being evacuated. By 1010 the USS SUSAN B. ANTHONY had sunk, but not before all hands and a large proportion of equipment had been safely transferred to other ships. Fortunately, no troop loss of life had resulted. One officer and 14 men of the ship's complement were injured, but none were killed.

After the explosion an inspection of the ship was made by the senior medical officer. The medical office was found to be in a state of wreckage, with files opened, decks upturn, the book-case smashed, the safe wrenched out of position, and cabinets upset. In the sick bay all bunks were torn from the bulkheads, cabinets were upset, and their contents spilled onto the decks. In the operating room the head and its bulkhead were destroyed. Plumbing connected with the stabilizers had been pulled apart, but the autoclave remained in position. Broken batteries resulted in the emergency battery light being inoperative, lockers lay on the deck, but the water tank and oxygen unit remained intact. The storerooms were demolished, with supplies scattered along the deck in a useless condition. Strong fumes from the contents were observed. The diet kitchen was the least damaged place, there being only a few broken dishes. In the pharmacy all bottle racks had broken loose, the bottles were smashed on the deck, the safe and microscope had fallen to the deck, and the scales were broken. The isolation ward was wrecked, and all bunks and lockers were lying on the deck. The dental office was upset, but little

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damage was done to the apparatus, which had remained in place.

Patients were sent to the various stations. At 0840 a message was received to evacuate casualties at the port side of Number 4 hold, and about 20 stretcher cases were rigged and lowered to the deck of the USS PINTO, and almost immediately transferred therefrom to the British DD, L 60. The health records of the officers and crew were placed in a canvas bag and transferred to the care of the PhML/c aboard the USS PINTO. The types of injuries sustained were 7 fractured legs, 1 fractured arm, 12 head injuries, 2 nose injuries, 2 crushed chests, 6 back injuries, 3 knee injuries, 1 hip injury, 1 crushed hand, 1 abdominal injury, and various contusions, lacerations, and abrasions. By 0915 all casualties had been evacuated, and first aid was continued for minor cases. Hospital personnel were transferred to USS LST 134 by 0950, with the exception of two who went to USS LST 375. Aboard the LST's, these men aided in the care of casualties.⁷

The report of the USS BALDWIN (DD624) is illustrative of the problem of keeping up the efficiency of personnel under the strained conditions of almost continuous general quarters. Although there were no casualties, this vessel stayed at general quarters from 2200 5 June to 1430 8 June. Messing was greatly facilitated by use of Army K rations,

7. "Report of Loss of the USS SUSAN B. ANTHONY (AP72)", from the Commanding Officer to the Secretary of the Navy, 7 June 1944, pp. 21-24.

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of which there were 900 units aboard. These were supplemented by soup, sandwiches, and coffee at noon on the second and third days, and frequent distribution of coffee and water by the repair parties. The use of heads was limited to the fourth hour of every four. Ventilation was started at intervals, and then stopped. Rest periods for the men were taken at every opportunity during lulls in fighting by letting a portion of the men at stations relax or sleep, while the others remained alert.⁸

The USS BAYFIELD, although not designated to handle casualties, performed creditable work. By D plus 10 days, a total of 419 casualties had been brought aboard, of which 307 were received on one night. These men were distributed throughout the ship in the junior officers' quarters, troop officers' quarters, troop quarters, mess deck, and sick bay. These casualties were removed to other vessels the following day, after having received examinations and medical care.

LST's, playing a major part in the invasion of Normandy, went through diversified experiences. In addition to receiving Allied casualties, many POW's were received; they were given the same treatment as Allied patients. A description of some of the POW's is given by one LST medical officer, who reported:

8. "Action Report for June 6-8, 1944, USS BALDWIN (DD624)", from the Commanding Officer to the Commander in Chief, United States Fleet, p. 12.

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Our Army in one big drive captured an enemy field hospital and we received the largest part of the patients. These patients were sadly in need of care. In some of the cases maggots were found eating away the dead tissue. We transplanted some of these to wounds of other patients for further cleansing of dead tissue.⁹

Continuing, the report mentioned that 1 emergency appendectomy, 3 guillotine amputation of legs, and 57 debridements were performed, mostly bullet and shrapnel removals. These major operations were done under pentathol sodium anesthesia, except for exploratory cases in which ether was used. In minor surgery 2 percent procaine hydrochloride was employed. No ill effects were noted from any of these agents. Sulfa drugs, penicillin, and barbiturates were given freely to those requiring them, and no sensitivity developed. Gas gangrene serum and tetanus vaccine were used when necessary, and no cases were lost due to these causes.¹⁰

The report of USS LST 7, commenting further on the condition of German wounded brought aboard, declared:

On one occasion this ship transported a load of German wounded with their own medical officers. There was not a single wound redressed during the trip that was not terribly septic or gangrenous. It is doubtful if any medical officer of the U. S. Navy has ever seen anything quite as revolting en masse and certainly not on our own boys. Thank God we are Americans!!¹¹

The report of USS LST 346 is illustrative of conditions met

9. "Annual Sanitary Report, LST 516, 1944", p. 9.

10. Ibid., p. 7.

11. Historical Data Report, USS LST 7, 1944, p. 2.

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during the early assault stages. So far as this ship was con-

cerned, there was some delay in getting LCT's to approach to take off supplies and equipment while the LST was at anchor. Furthermore, hardship to casualties was experienced when they were brought aboard prior to the unloading of troops and vehicles. Makeshift arrangements were resorted to by using crew quarters, but many casualties were forced to remain in the damp and cold on the weatherdeck. Furthermore, this LST did not have hospital accommodations, and did not fly the "Mike" flag, but was sent more casualties than were sent to LST's designated as hospital ships. DUKW's returning to the beach, after unloading casualties, would not take medical gear and blankets, thus making it necessary for the LST to return to England without disposing of them. All cases with wounds of the thighs, buttocks, and extremely dirty wounds, and compound fractures, - received 20,000 units of penicillin every 4 hours, with a total of 1,000,000 units being administered.¹²

Sea rescue boats were used extensively in the Normandy operations, while in the Salerno landings LCI(L)'s had been used. This was the first known use of 83-foot Coast Guard cutters in amphibious landings. Between D-day and 19 July 1944 over 1,000 men were rescued by these cutters. A total of 194 survivors were picked up off Omaha Beach and 157 off Utah Beach during the first hours of operation on D-day, while in the eastern area cutters picked up 133 survivors. From D-day through 17 June, they rescued 535 survivors. The following

12. "Medical Report, USS LST 346", from the medical officer to the commanding officer, 17 June 1944, pp. 1-4.

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extract from the log of one of these boats illustrates the duty performed by them:

Cutter Sixteen 1730, 5 June joined invasion task force (Convoy U-1A) off Portland Bill. 0300, 6 June, arrived area - 0530, accompanied invasion barges into shore under severe shelling attacks and with mines going up all around us. 0730, LCF-31 hit by shell 800 yards off shore, sinking immediately. While engaged in picking up survivors, shell struck PC-1261, which disintegrated, scattering men and debris over a wide area. While so engaged, shells and bullets were falling near by, and just after last man picked up, small landing craft only few hundred yards off shore blew up. Proceeded to spot and picked up all living survivors. Then proceeded to APA Dickman and unloaded survivors. Two men pronounced dead, but one was revived later and put aboard an LST. Departed again for invasion coast. 1045 sighted LCT-777 down by stern 1500 yards from the beach. Moored alongside and took off all wounded. After leaving this ship, which was being used as an ammunition ship, was told by one of the survivors (soldier) that a wounded man with two broken legs was still inside one of the gun tubs, so returned alongside for the second time. Crew passed line under wounded man's arms and hauled him clear just as LCT turned turtle. These survivors turned over to an LST which was acting as a hospital ship. No more rescue work during balance of day or following night. Received orders to return to base. Arrive 1700, 7 June, 1944. ¹³

The majority of survivors were so weak that help had to be provided in bringing them aboard. Davits for hoisting 400 pounds of weight were on some of the cutters, and RAF valise type life rafts, scramble nets, and life lines were also used. Reports indicated that approximately 50 percent of all survivors picked up during the first 48 hours were either seriously wounded or suffered from shock. Although pharmacists mates were not aboard, first aid on the cutters saved a number of survivors. In some cases, even where two limbs had

13. "Action Report - U. S. Coast Guard Rescue Flotilla One, during assault on American sector, Coast of Normandy," 19 July 1944, p. 4.

been blown off, survivors were kept alive until transferred to hospital ships. In addition to brandy issued as a stimulant, coffee and tea were available to each unit, as were blankets. As the brandy and blankets proved insufficient in some instances, several crew members gave their own clothing to keep survivors warm and dry. In addition to straight rescue work, an assortment of miscellaneous duties was performed, including the urgent transfer of blood plasma, spotting of mines, and engagement with enemy air-craft.

Comments, Conclusions, and Recommendations

Various observations may be made on the medical aspects of the Normandy landings, so far as the Navy was concerned. Medical personnel of the Navy were assigned operationally to LST's in April and May as they became available in the theater. Army medical personnel arrived on board on 25 May, and were generally detached about a month later, during which time they participated in an average of 3.8 trips and carried patients on 2.2 trips; 84.8 percent of the medical officers considered the distribution of medical personnel to LST's as adequate, 13.4 percent considered distribution as inadequate, and 1.8 percent considered it to be excessive. The preliminary training and indoctrination of medical personnel proved to be of value. For future operations, it was believed that minimum medical personnel requirements for LST's for an average casualty load of 150 casualties for 36 hours should be 2 medical officers (including 1 surgeon) and 20 hospital corpsmen (including at least 2 surgical technicians),

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reinforced by surgical teams, to be available in the early assault stages. Later, if LST's were to be used as ambulance ships, 1 medical officer and 10 hospital corpsmen would be sufficient.

The operational distribution of medical material was considered to be adequate by 86 percent of medical personnel, excessive by 12.6 percent and inadequate by .06 percent. Although basic normal requirements were met, resulting in a reduction of transporting, storing, issuing, and requisitioning, it was believed that there was some need for modification of medical allowances. Particularly, revision of LST casualty treatment units and medical officers' emergency surgical outfits, supplying wider plaster of paris bandages, pre-packaging of sterile burn dressings, and a standardized uniform type of "Running Record of Battle Casualties" were stressed. In general, basic medical supply and resupply units were adequate for the Normandy operation. However, it was recommended that a standardization of a uniform basic allowance, supplemental to the ships' allowances for LST's, be established. Specifically, it was suggested that whole blood, penicillin, biologicals, etc., be issued to each LST, and the allowance for LST's be increased, as should the allowance of bleaching powder for purifying water, and the emergency ship's toilets for sanitary reasons.

8 Structural characteristics were inadequate in some instances. Toilet facilities were insufficient on tank decks. The transportation of litter cases was difficult, and the top tiers of

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stretcher racks on LST's were inaccessible because of their height from the deck. The platform at the after end of the tank deck was located directly below the forced draft ventilators, which caused undesirable air circulation and precipitation of moisture in the surgery area. In general, however, structural arrangements were an improvement over those in earlier operations. For future operations, it was recommended that all LST's be converted for casualty handling; improvement be made in sanitary facilities; alterations include openings from the tank deck into the troop spaces; better access be provided for handling litter cases; the receiving ward, wash room, and operating room be located in the troop spaces with ingress and egress provided to and from the tank deck; demountable ladders be provided to escape hatches; and permanent stowage space be allocated in each ship for supplemental medical materiel.

Casualty evacuation demonstrated the usefulness of LST's. A compilation of casualty figures received from 83 LST's for the first 3 round trips showed 4,480 (32.5 percent) ambulatory cases, and 9,293 (67.5 percent) stretcher. Of LST's afloat, 5,682 (55.7 percent) casualties were loaded over the ramp, 3,484 (34.1 percent) were hoisted by sling, and 1,031 (10.2 percent) were hoisted in boats to the deck level; 3,576 (26 percent) were loaded over the ramp on LST's and dried out or beached. Individual officers criticized the unequal distribution of LST's for casualty evacuation during the landings. However, military necessity decreed concentration of casualty evacuation

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in certain LST's to free the remainder for other duties. The LST provided an excellent means of casualty evacuation where only short hauls were required. Loading of LST's was best accomplished over the ramp when the ship was beached or dried out; and the other methods of loading casualties were of practical value in meeting variable situations.

Hospital ships were unsatisfactory in general, although they did free a larger percentage of LST's for other uses. Some of the difficulties encountered were due to the fact that these ships were not fitted for amphibious casualty evacuation. Ambulance boats assigned to these ships were not adapted to carry standard pole litters, and were difficult to load. Casualty-handling equipment was lacking. Furthermore, medical personnel had no special training for the task of evacuation, and confusion was experienced because these ships were controlled by the British Ministry of War Transportation. Despite these considerations, these vessels completed 6 trips by D plus 11 days, and carried some 2,272 casualties. For future operations, it was recommended that these vessels be under the operational control of the Task Force; assigned personnel should be thoroughly trained in the duties involved; and casualty handling equipment should be provided, including the refitting of ambulance boats to handle standard U. S. stretchers.

Other casualty evacuation facilities, including APA's

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and AKA's, LCI(L)'s, sea rescue craft, and air evacuation served a useful purpose. Medical personnel and materiel were more than adequate on transports, but, with the exception of the USS BAYFIELD and the USS ACHENAR, these ships played only a minor part in casualty handling, with only 560 casualties evacuated to England. LCI(L)'s were not generally utilized for casualty evacuation, although they performed a creditable job of handling casualties temporarily coming under their care. Sea rescue craft carried out their tasks in a satisfactory manner. Evacuation of casualties by Navy planes was not tried, although the transportation of evacuees by Army planes was followed with excellent results.

Inspection on the far-shore combat beaches indicated that mobility was limited and casualty evacuation control was hampered in Navy beach medical units by having no designated means of transportation assigned. These inspections resulted in closer cooperation and understanding of immediate medical problems, thus enhancing a greater joint efficiency of the Army-Navy medical service in the vicinity of combat beaches. The utilization of a Navy evacuation control officer on each beach contributed to casualty evacuation efficiency. It was recommended for future operations that one jeep per beach platoon and two DUKW's per beach company be assigned for exclusive medical use, and that amphibious medical service doctrine include the services of a Navy evacuation control officer.

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The performance of Navy medical personnel in beach battalions was generally effective. However, Army medical facilities took over practically all functions in the beach area about D plus 8 days with additional service being rendered by naval personnel during and immediately after the storm between D plus 13 and D plus 16 days. Medical sections of beach battalions were composed of especially designated naval personnel, not from APA complements. Additional beach battalion personnel had been requested, but none were provided. The high casualty rate among medical personnel of beach battalions on Omaha Beach indicated that planning for these reserves had been sound. Had APA personnel been provided, and had APA's performed their usual role in evacuation, the medical services of the transports would have been seriously hampered. Although the services performed by beach medical personnel were exemplary, it was believed that trained landing force personnel could have performed the task equally well. Such assignment in the future would conserve medical personnel by virtue of "phasing in" the usual medical organizations existing in the landing force. Recommendations after the Normandy landings suggested that existing doctrine, as relating to beach party medical personnel, be reviewed to establish unity of control, eliminate duplicity of function, and promote general efficiency of medical service on the assault beaches. The landing force should assume full responsibility for all medical duties landward of the high water mark, including the actual loading of craft and other boats in seaward evacuation.

Afloat, the loss of supplies in early assault phases was com-

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pensated by provision of critical material in beach bags, and by litter units of landing craft - through emergency issues made by LST's and from salvaged materiel. Despite loss, the supplies provided were adequate. It was recommended that the beach bag (Stock No. S13-468) be retained as the means of effecting emergency resupply to beach medical units during the assault stages of amphibious operations.

On the near-shore, the U. S. Army chain of evacuation and hospitalization facilities as established in the British Isles were effective. These facilities were supplemented by medical installations in various U. S. naval bases and by the 1,000-bed U. S. Naval Hospital at Netley, Hants. Although not in the direct chain of evacuation, these naval activities played an important part in the care of casualties coming under their cognizance. Medical materiel proved to be adequate, and the medical resupply set up conjointly with the U. S. Army functioned most satisfactorily.¹⁴

14. G. B. Dowling, United States Naval Medical Service in the Invasion of Normandy, pp. 23-28, is the basis for the above summary.

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NORMANDY

B I B L I O G R A P H Y

"Action Report for June 6-8, 1944, USS BALDWIN (DD624)", from the Commanding Officer to the Commander in Chief, United States Fleet, n. d.

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Annual Sanitary Report, LST 516, 1944.

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"Medical Preparation and Casualty Handling, Operation Overlord," from the Staff Medical Officer to P. E. Howard, Commander, USN, n. d.

"Medical Report, USS LST 346," from the medical officer to the commanding office, 17 June 1944.

"Report of loss of the USS SUSAN B. ANTHONY (AP72)," from the Commanding Officer to the Secretary of the Navy, 7 June 1944.

Dowling, G. B., Captain, (MC), USN, Special Report to the Chief of the Bureau of Medicine and Surgery, U. S. Navy, of United States Naval Medical Service in the Invasion of Normandy, 6 June 1944, 11 January 1944.

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CHAPTER XVIII

SOUTHERN FRANCE

Summary

The invasion of Southern France, taking place on the Mediterranean coast in the Toulon-Cannes area, was begun on 15 August 1944. United States Army forces under Lt. Gen. A. M. Patch, Commander of the 7th Army, and U. S. Navy forces under Vice Adm. H. K. Hewitt, Commander of the 8th Fleet, constituted the main forces of attack. During the operation, which utilized more than 1,000 ships, the Navy Medical Department played its usual role in giving medical care to all personnel of all services while on Navy ships and evacuating casualties seaward until the Army could be established ashore to treat, hold, and evacuate in the routine manner.

The responsibility of the Navy in caring for all personnel while on Navy ships did not preclude cooperation on the part of medical personnel of other services embarked, nor was there an attempt to impose uniform routine on all ships. Medical officers were directed to provide ample sick call facilities in the manner best suited to the individual ships. Small boat crews were given thorough first-aid procedures to enable them to care for personnel aboard their own craft.

Plans for seaward evacuation were influenced by preceding operations in this theater. Hospital ships were to be used for the main casualty lifts. LST's and transports were to be used less

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extensively. During the planning stage, casualty figures of the Sicily, Salerno, and Anzio campaigns were thoroughly analyzed, and a daily maximum casualty rate was formulated. This rate was broken down into classes, and 15 percent added as an overall safety measure. Evacuation facilities were provided for this number. The evacuation organization consisted of force and area evacuation officers, medical sections of beach battalions, ambulance boats, evacuation ships, and medical units in the rear echelon.

The force evacuation officer, embarked in the USS CATOCTIN, was responsible for the coordination of all parts of the medical plan. The area evacuation officers were embarked respectively in the USS DUANE for Task Force 84, the USS BISCAYNE for Task Force 85, and the USS BAYFIELD for Task Force 87. Area evacuation officers were responsible for the coordination of the medical plan within their respective areas, which were designated as Alpha, Delta, and Camel.

Plans called for a clear-cut division of responsibility between the medical sections of the Army and Navy ashore. The Army was responsible for the care of casualties landward of the high-water mark, for their transportation to Navy evacuation stations, and for furnishing check-off lists of all casualties thus transported. The Navy was responsible for the care of casualties in Navy evacuation stations, for evacuating casualties seaward, and for keeping a record of all casualties evacuated. Three Navy beach battalions took part in the operation — the 1st in the Alpha area, the 4th in the Delta, and the 8th in the Camel area. The medical sections of

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the 1st and 4th performed their duties in a smooth and satisfactory manner, taking advantage of lessons learned in previous operations. The 8th, however, having had no previous combat experience, was poorly organized and considerable confusion and inefficiency resulted during the first three days. The area evacuation officer, going ashore on D plus 3 days, was able to effect proper coordination between the beach battalion, Army medical sections, and ambulance boats. The main cause of confusion appeared to have been a lack of appreciation of the importance of medical sections ashore.

Ambulance boats handled evacuation efficiently. All boats transporting troops and equipment ashore were available to evacuate casualties from the shore. Beachmasters were directed to utilize these craft whenever possible. Fortunately, casualties were only a fraction of those anticipated.

Ships available for casualty evacuation included hospital ships, transports (APA's and XAP's), LST's and AKA's, task force flagships, combatant ships, LCI(L)'s, and ships of the Merchant Marine. Hospital ships were used most extensively, because of their suitability and the relatively short turn around periods making them available when needed. The location of U. S. Army and British hospitals in Naples and French Army hospitals in Oran made it necessary for the ships to evacuate their respective casualties to these ports. It had been estimated that 12 hospital ships would be needed to evacuate the maximum load of casualties from the assault area to the hospitals in the rear echelon, and that 15 would be the desired number. Because

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of operational needs in other theaters of operation, only 12 Army hospital ships were assigned, and of these 11 actually became available. One Navy hospital ship, the USS REFUGE, was assigned. The 12 hospital ships were placed in a hospital ship pool under the operational control of the principal sea transport officer (PSTO) of Allied Force Headquarters. These were sent into the combat area on an automatic schedule beginning on D plus 1 day and continuing through D plus 6 in the following order:

	<u>Ship</u>	<u>Patient Capacity</u>	<u>Speed</u>
D plus 1	1. USAH ALGONQUIN	455	14.5
	2. USAH CHATEAU THIERY.....	511	15.3
	3. USAH SHAMROCK.....	543	14.5
D plus 2	1. USAH JOHN CLEM	291	14.5
	2. USAH ACADIA	788	18
D plus 3	1. USAH EMILY WEBER	737	13
D plus 4	1. USAH MARIGOLD	799	13
	2. USAH ERNEST HINES	287	14
D plus 5	1. USAH SEMINOLE	456	13
	2. USAH MEANY	579	11
D plus 6	1. USS REFUGE	630	10.5

Hospital ships were not taken into the combat area on D-day, as experience had shown that casualties were relatively higher on days succeeding D-day. During D-day, APA's and XAP's were sufficient to meet evacuation requirements. After D-day, hospital ships appeared at the outer screen of ships at sunrise and departed from their anchorages one hour before sunset. Those less than 50 percent loaded were directed to proceed to the outer screen to take up their work the following day. Beginning on D plus 7 days hospital ships were

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dispatched to the combat area by the principal sea transport officer on request of the 7th Army, which by that time had established sufficient evacuation and field hospitals in the target area to give them adequate holding capacity. The automatic schedule functioned satisfactorily, with ships arriving on schedule in most instances. A few exceptions, caused by minor difficulties in communication on D plus 1 and D plus 2 days, were noted. Beachmasters provided ambulance boats to dispatch patients from evacuation stations. Approximately 1,800 casualties were evacuated to hospital ships during the period when automatic schedules were used.

Transports were used for casualty evacuation on D-day. Twelve of these took part in the operations, and were equally distributed to the three assault areas. Their medical staffs were augmented by personnel in the theater, allowing the medical facilities to be used to capacity. D-day casualties were light, and transports were more than sufficient to meet all requirements.

United States Navy LST's entering the assault area carried 1 Navy medical officer and 5 or more hospital corpsmen. Although prepared to carry capacity loads of casualties, they were to be used only in case of necessity, with lifts limited so far as possible to walking cases. For litter cases, the haul to Naples and Oran was considered to be too far for this type of evacuation ship. As casualty rates were low, and hospital ships were sufficient, it was not necessary to use LST's for evacuation.

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Task force flagships were prepared to accept casualties during the periods at night when transports had departed and hospital ships were not available. Two of the flagships, the USS CATOCTIN and the USS BAYFIELD, were comparable in size and medical facilities to APA's and XAP's. Advantage was taken of this by augmenting medical department complements and preparing them to accept casualties if the need arose. Both ships received casualties at night; these were treated until their evacuation to hospital ships could be effected.

Combatant ships, LCI(L)'s, and merchant ships were not used for casualty evacuation, although they were prepared to do so if the need arose. Occasional use was made of LCI(L)'s to transport casualties from the beaches to hospital ships.

During the early phases of the invasion of southern France no attempt was made to classify casualties on the beaches according to nationalities. All American and British patients were evacuated to Naples, where classification was effected, and French casualties were sent to Oran as transportation became available. Later, the French Army made use of civilian hospitals on the French coast. A small number of French patients were transported to Naples and then to Oran. As the need for hospital ships decreased, they were released for other duty; and evacuation from Naples to the United States began. The USS REFUGE was released on D plus 15 days, and sailed for Oran and the United States on D plus 31 days.

Casualties among U. S. Navy personnel participating in the operation up to and including D plus 41 days were 35 killed in

action, 36 missing, and 243 wounded. Most of those listed as missing were later classified as dead; the wounded referred to here were only those receiving injuries as a result of enemy action.

Casualty reports were reduced to a minimum. Beach battalions made no separate reports. The Army furnished those lists of casualties sent to evacuation stations, which were used to check off casualties as they were evacuated seaward. Names of those evacuated independently of the Army were added to these lists. Check off lists were then forwarded to the Detachment of Patients, 7th Army. Evacuation ships prepared reports in triplicate, which gave the following information on each casualty aboard: full name, rate or rank, service or serial number, organization, hour and date received aboard, date disembarked, diagnosis and treatment given aboard, and condition on disembarkation. The original report was mailed at the port of disembarkation to the office of Detachment of Patients, 7th Army; one copy was mailed to Commander 8th Fleet, and one copy was retained on board. Reporting of Navy casualties was carried out in accordance with directions in Navy Regulations and the Manual of the Medical Department. Burial of the dead was under the direction of the Graves Registration Services. No burials at sea were recorded. ¹

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1. A summary of medical phases in the invasion of Southern France, upon which this chapter is based, is to be found in "Invasion of Southern France", 29 Nov. 1944, pp. 364-370, from the Commander U.S. Eighth Fleet to the Commander in Chief, U.S. Fleet. "Medical Department Report of the Operation Incident to the Invasion of Southern France, 15 August 1944", 3 Nov. 1944, pp. 1-8, from the Fleet Medical Officer, Eighth Fleet, to the Commander United States Eighth Fleet, gives essentially the same information. Action Report-"Assault on the Beaches of Southern France", 7 Sept. 1944, pp. 26-27, from the Commander Task Force 87 to the Commander in Chief, U.S. Fleet, gives specific information for the Camel area.

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GLOSSARY

AA	Antiaircraft
ACORN	Ground construction and maintenance forces for aircraft units.
AGC	Amphibious Force Flagship
AH	Hospital ship
AK	Cargo ship
AKA	Cargo, Attack
AKN	Net Cargo Ship
Amtracks	Amphibious tractor
AP	Transport
APA	Transport, Attack
APD	Transport (high speed)
APH	Transport Fitted for Evacuation of Wounded
AVP	Seaplane tender (small)
BARman	Browning Automatic Rifleman
BLT	Battle Landing Team
Cincpac	Commander in Chief Pacific
CM	Mine Layer
CO	Commanding Officer
ComDesRon	Commander Destroyer Squadron
ComGen	Commanding General
ComPacFlt	Commander, Pacific Fleet
ComPhibsPac	Commander Amphibious Forces, Pacific
ComTaskUnit	Commander Task Unit
ComTransDiv	Commander Transport Division

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CP	Command Post
CPO	Chief Petty Officer
CTF	Commander Task Force
CTG	Commander Task Group
CUB	Advance base unit having medical facilities of 200 beds.
CV	Aircraft Carrier
CVE	Aircraft Carrier, Escort
DD	Destroyer
D-day	Day scheduled for the landing of forces.
DDT	Diphenyl-Dichloro-Trichlorethane
DM	Light Mine Layer
DMS	Mine sweeper, high speed
DUKW	Large Amphibious Vehicles
Dumbo	PBY (patrol bomber)
EMT	Emergency Medical Tag
H-hour	Time scheduled for the landing of forces.
HOW	Another way of referring to H-hour.
H & S	Headquarters and Service
KIA	Killed in Action
LCI	Landing Craft, Infantry
LCM	Landing Craft, Medium
LCP(L)	Landing Craft, Personnel (large)
LCP(R)	Landing Craft, Personnel (with ramp)
LCS(L)	Landing Craft Support (large)
LCT	Landing Craft Tank
LCVP	Landing Craft, Vehicle and Personnel

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LSM	Landing Ship, Medium
LST	Landing Ship, Tank
LST(H)	Landing Ship, Tank (casualty evacuation)
LSV	Landing Ship, Vehicle
LVT	Landing Vehicle, Tracked
L-day	Day scheduled for the landing of forces.
MarDiv	Marine Division
MC	Medical Corps
MIA	Missing in Action
Mob	Mobile Hospital
NOB	Naval Operating Base
PBY	Patrol Bomber
V Phib Corps	Fifth Amphibious Corps
PhM	Pharmacist's Mate
PT	Patrol Torpedo Boat
RCT	Regimental Combat Team
SCAT	South Pacific Combat Air Transport Command
SK&E	Sick and Evacuated
Seabee	Construction Battalion
SMO	Senior Medical Officer
SOP	Standard Operating Procedure
T/O	Table of Organization
TransDiv	Transport Division
TransRons	Transport Squadrons
UDT	Underwater Demolition Team
W & E	Wounded and Evacuated

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Weasols

Small Amphibious Vehicles

WIA

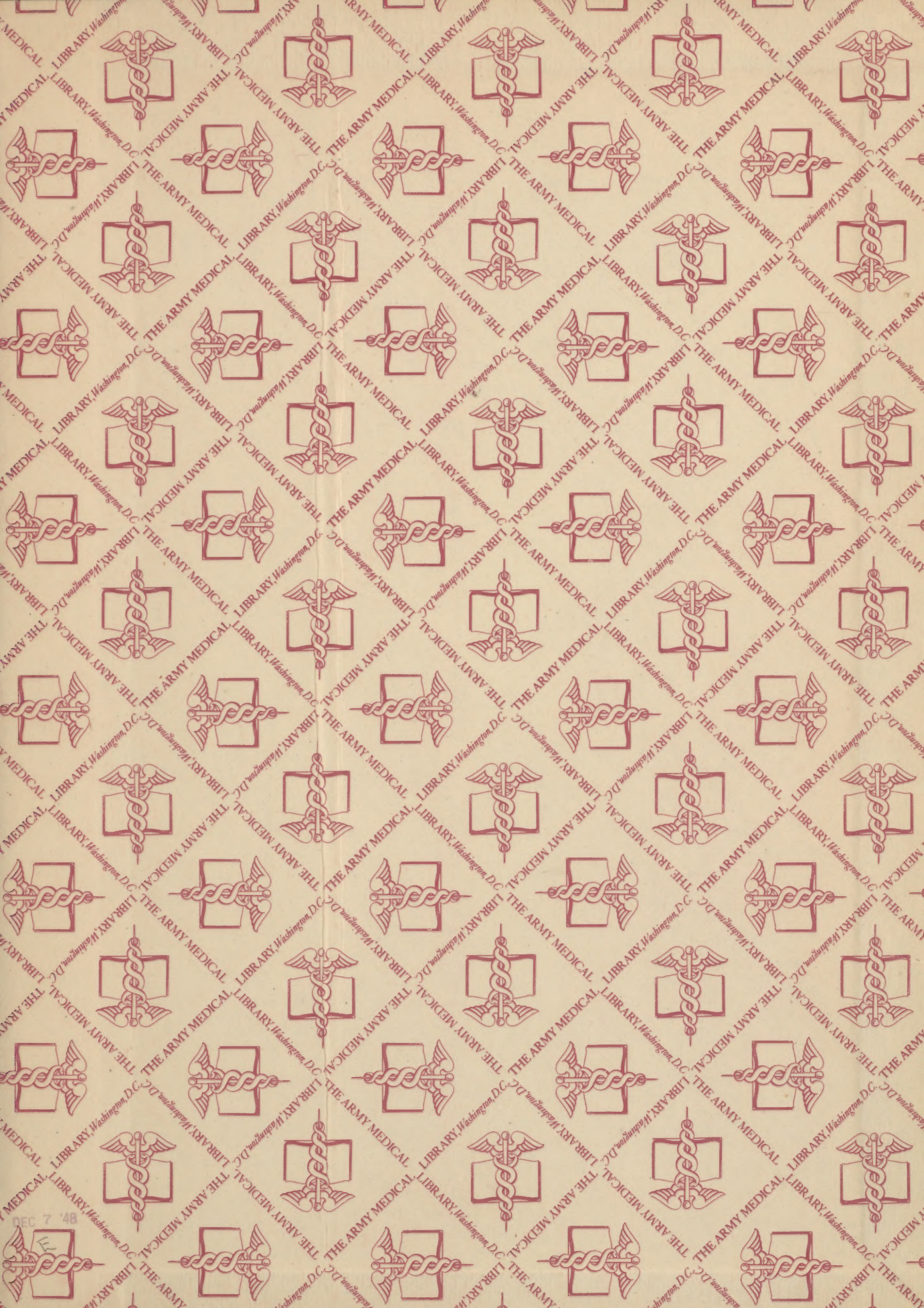
Wounded in Action

WNE

Wounded not Evacuated

XAP

Transport Miscellaneous



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